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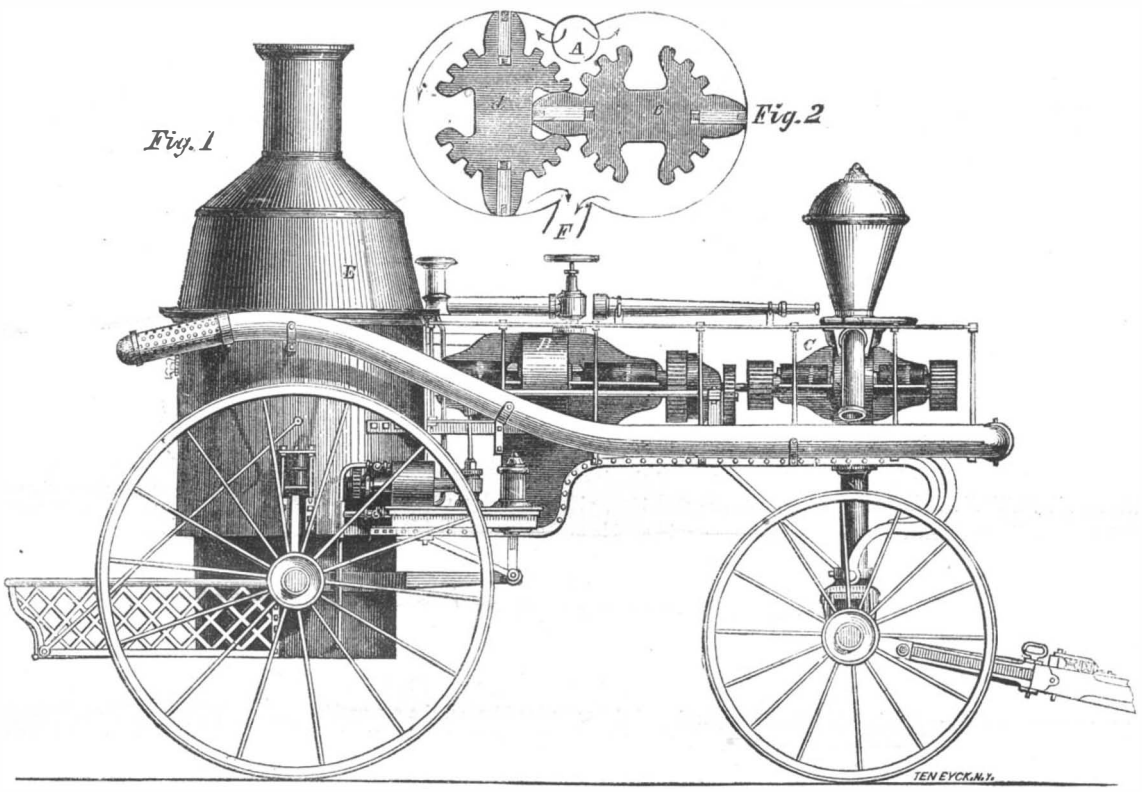
VOL. II.—No. 9. NEW YORK, FEBRUARY 25, 1860. NEW SERIES.

IMPROVED STEAM FIRE ENGINE.

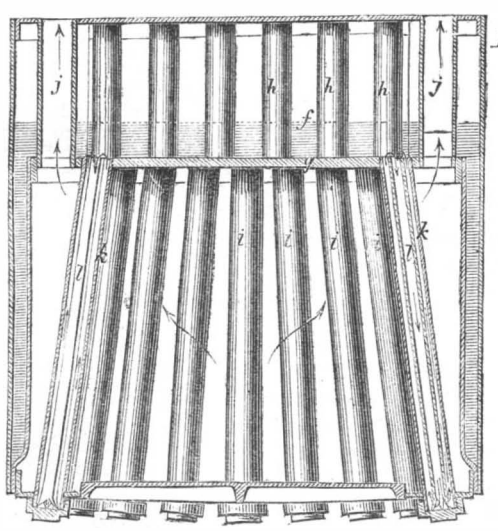
The superiority of a rotary motion for a steam engine is so manifest that it is not strange that many attemtps have been made to overcome the practical difficulties to which it is subject. One of these difficulties—indeed, the principal one—has been the packing of the part which performs the office of the piston in the straight cylinder. Robert Stephenson expressed the opinion a few years ago, that a rotary engine would never be made to work profitably on account of the difficulty of packing. For our own part, though we have cautioned our readers that the field had been gone over many times by men of rare genius, our experience has so impressed us with the fertility of resource among our inventors that we have always entertained a lingering hope of seeing the defects in the rotary engine all removed, and its great advantages rendered available. The most palpable of these advantages are the reduction in the size of the engine in proportion to the power (resulting from the greater velocity of the piston) avoidance of the tremendous strain, especially in propelling ships, and finally a great saving of power which is expended in the reciprocating engine in overcoming inertia, in changing the direction of the motions. This last subject is forcing itself more and more upon the attention of mechanicians, and its importance is not yet by any means fully appreciated. These advantages adapt the rotary engine in an especial manner to the driving of a locomotive fire engine; and when our readers are told that this application has been made, that all difficulties have been surmounted, and that the packing, after 18 months' trial, has been found perfectly tight, they will sympathize with us in our interest in these statements. They are made by Silsby, Mynderse & Co., in relation to the engines which they manufacture on the plan invented by Birdsill Holly, and patented in 1855. We have already given two engravings of engines made on this plan, but the important modifications which have been made in the mode of constructing them, combined with the great interest felt both in rotary engines and in steam fire engines, induces us to give this third illustration in order to keep our readers informed in regard to the progress of improvement in both these machines.

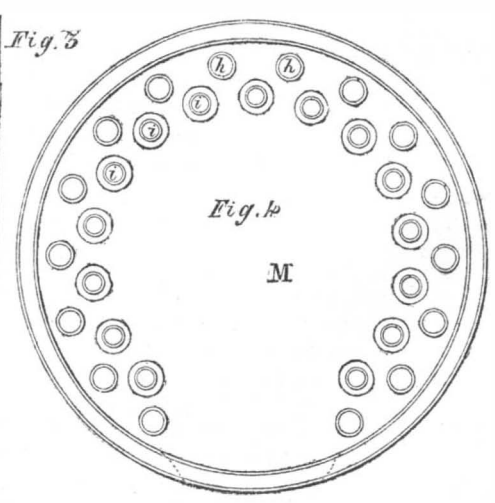


SILSBY, MYNDERSE & CO.'S STEAM FIRE ENGINE.

Fig. 1 is a view of the whole machine, E being the boiler, B the engine, and C the pump. The construction of this engine is illustrated in Fig. 2. The steam enters at A, and passes out at F, turning the two revolvers, *c* and *d*, in its passage. The sides of these revolvers are packed as represented, by the blocks of metal inserted into the grooves and pressed out by the elastic springs. The ends of the revolvers are ground to the ends of the cylinders in which they turn; and we are assured that, after eighteen months' use, these ends still fit absolutely steam-tight. The pump is made precisely like the engine; the revolvers, being carried around by gears upon the outside of the cylinder, are worn very little where they run together.

The principal improvement in this fire engine, made since our last illustration, is in the boiler, of which Fig. 3 is a vertical, and Fig. 4 a horizontal section. The fireplace is represented at M, Fig. 4, with the vertical water-pipes, *i i i*, passing directly through the fire. These pipes are closed at the bottom, and open at the top where they pass through a water-tight plate, *g*, and communicate with the water in the boiler which rises to the level of *f*. They are represented in section at the sides, *k k* being the external, and *l l* the internal tubes, both open at the top, and the internal tubes having openings at the bottom. This arrangement causes a constant current, the water rising on the outside of the tube, *l*, as it is heated, and its place being supplied by a current flowing downward through the tube from the boiler. The smoke and flame pass among the tubes, *i i i*, and up through the flues, *h h h*, which are represented in section at the sides, *j j*. It seems to be now the pretty general opinion that steam can be generated more rapidly in vertical tubes than by any other plan yet tried.





The inventor of this improvement in boilers is M. R. Clapp, who has assigned his interest to Messrs. Silsby, Mynderse & Co., of Seneca Falls, N. Y., to whom persons desiring further information in relation to these boilers or engines will please address.

EXPERIMENTS WITH WATER WHEELS AT PHILADELPHIA.—As we have had many inquiries regarding the experiments with water wheels at Philadelphia, under the supervision of Chief-engineer Birkenbine, we would state, for the general information of all, that they are not yet quite finished. Two or three wheels have yet to be tested, but it is expected that these operations will be completed this month, and that some time during the month of March a report on the entire subject will be made out. We shall endeavor to present the same to our readers at as early a date as possible. We know that a very great interest is felt in the subject by our hydraulic engineers, millwrights, and mill-owners, becaus it is conceded by all those who have been witnesses of the experiments that they are conducted in a most fair and trustworthy manner.

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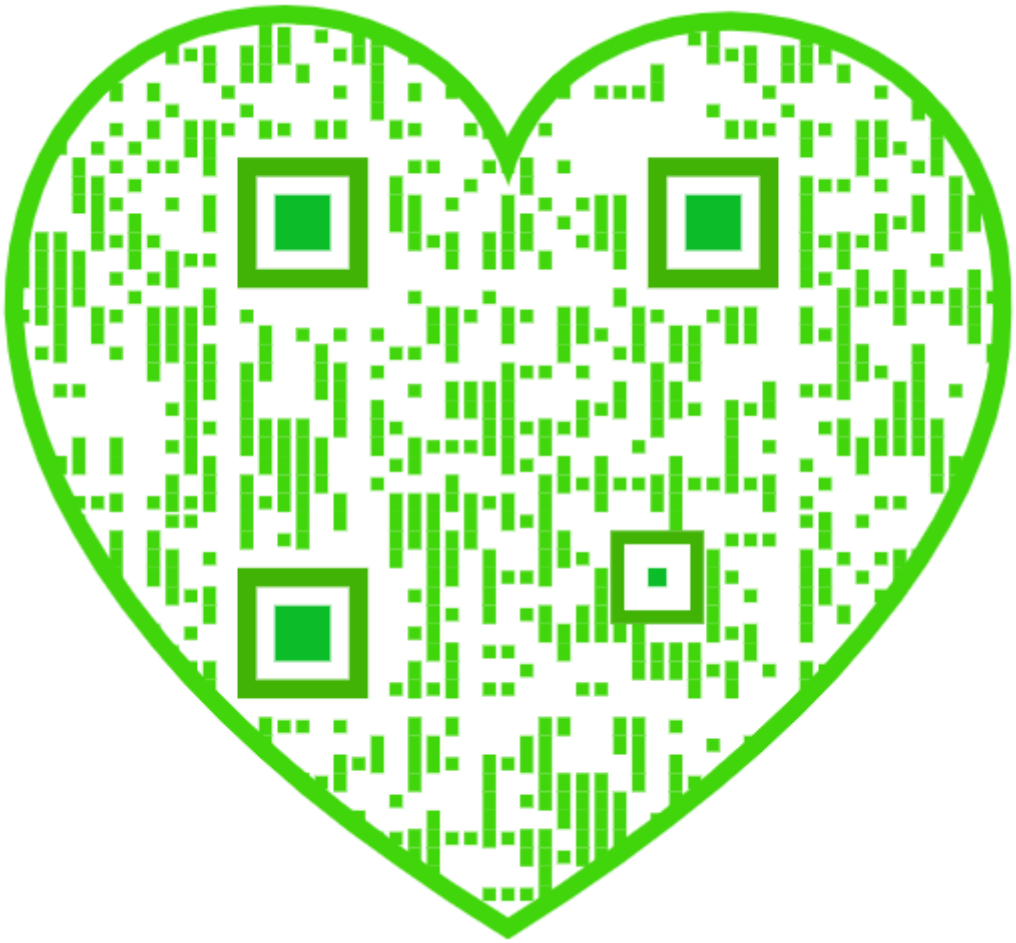

ANNUAL REPORT
OF THE
COMMISSIONER OF PATENTS.

UNITED STATES PATENT OFFICE,
January 26, 1860.

SIR:—In compliance with the 14th section of the act entitled "An Act in addition to an Act to promote the progress of Science and Useful Arts," approved March 3, 1857, I have the honor to submit the following report of the operation of this Office, during the year terminating the 31st of December, 1859:

No. 1.

Statement of the Transactions of the Patent Office during the Year 1859.

Number of applications for patents during the year 1859	6,225
Number of patents granted, including designs, re-issues and additional improvements	4,538
Number of caveats filed	1,097
Number of applications for extension of patents	41
Number of patents extended	32
Number of patents expired, Dec. 31, 1859	563

Of the patents granted, there were—

To citizens of the United States	4,491
To subjects of Great Britain	23
To subjects of the French empire	16
To subjects of other foreign governments	8

The patents issued to citizens of the United States were distributed among the several States, Territories, &c., as follows:—

New York	1,237	Michigan	64	Alabama	26
Pennsylvania	532	Vermont	63	Mississippi	25
Massachusetts	492	Missouri	63	South Carolina	15
Ohio	390	Georgia	58	Delaware	12
Connecticut	256	Dis't. of Col'bia.	58	Arkansas	5
Illinois	206	Maine	51	Minnesota	5
Indiana	142	Louisiana	51	Florida	4
New Jersey	119	California	43	Oregon	1
Maryland	116	Kentucky	41	Wash. Territory	1
Rhode Island	85	Iowa	37	U. S. Army	4
Wisconsin	71	Tennessee	31	U. S. Navy	2
Virginia	65	Texas	29		
New Hampshire	65	North Carolina	26	Total	4,491

No. 2.

Statement of Moneys Received at the Patent Office during the Year 1859.

Received on applications for patents, re-issues, additional improvements, extensions, caveats, disclaimers and appeals	$228,864 00
Received for copies and for recording assignments	17,078 15
Total	$245,942 15

No. 3.

Statement of Expenditures from the Patent Fund during the Year 1859.

For salaries	$93,242 30
Temporary clerks	43,475 25
Contingent expenses	41,561 48
Payments to judges in appeal cases	875 00
Refunding money paid into the Treasury by mistake	391 00
Refunding money on withdrawals	30,733 32
Total	$210,278 41

No. 4.

Statement of the Condition of the Patent Fund.

Amount to the credit of the Patent Fund on the 1st of January, 1859	$50,241 88
Amount paid in during the year	245,942 15
Total	$296,184 03
Deduct the amount of expenditures during the year	210,278 41
Which leaves in the Treasury on the 1st of January, 1860, the sum of	$85,905 62

No. 5.

Table exhibiting the Business of the Patent Office for Seventeen Years, ending December 31, 1859.

Years.	Applic'ns filed.	Caveats filed.	Patents issued.	Cash received.	Cash expended.
1843	819	315	531	$35,315 81	$30,776 96
1844	1,045	380	502	42,509 26	36,344 73
1845	1,246	452	502	51,076 14	39,395 65
1846	1,272	448	619	50,264 16	46,158 71
1847	1,551	533	572	63,111 19	41,878 35
1848	1,628	607	660	67,576 69	58,905 84
1849	1,955	595	1,070	80,752 78	77,716 44
1850	2,193	602	995	86,927 05	80,100 95
1851	2,253	760	869	95,738 61	86,916 93
1852	2,639	996	1,020	112,056 34	95,916 91
1853	2,673	901	953	121,527 45	132,869 83
1854	3,324	868	1,902	163,789 84	167,146 32
1855	4,435	906	2,024	216,459 35	179,540 33
1856	4,960	1,024	2,552	193,588 02	199,931 62
1857	4,771	1,010	2,910	196,132 01	211,582 09
1858	5,364	943	3,710	203,716 16	193,193 74
1859	6,225	1,097	4,538	245,942 15	210,278 41
Total	48,338	12,437	25,884	$2,025,488 01	$1,888,653 21

The above statement of the transactions of the Patent Office during the year 1859 affords a gratifying indication of the advancement of our country in the art of civilized life, and demonstrates the wisdom of Congress in enacting laws to protect the inventor in the enjoyment of the fruits of his labor. The patent laws of this country are based upon the idea that, if the inventor is afforded a reasonable protection for his invention, his energies and talent will be constantly exerted in devising something new and useful to the public. These laws have answered, to a great extent, the purposes for which they were intended, but experience has proved that they are yet defective in many respects. The necessity of further legislation on the part of Congress, for the purpose of remedying these defects, has been urged by my predecessors for the last five years. Congress, however, has failed to afford the remedies so urgently desired. Notwithstanding this, I deem it my duty again to call its attention to this subject, in the hope that the still greater necessity which now exists for further legislation, and the important bearing which the patent laws now have upon all sections of the country, will prove sufficient to engage its immediate attention.

Under existing laws no provision is made for securing the testimony of witnesses in contested cases pending before this Office. As a natural consequence of this, cases are frequently decided, involving thousands and even hundreds of thousands of dollars, upon the testimony of merely voluntary witnesses. Many persons whose testimony is important in such cases, well knowing that there is no law by which they can be compelled to testify, either decline to appear as witnesses at all, or govern their action according to the amount of money which may be offered by the parties in interest. The result of this is that, in such cases, the poor are completely in the power of the rich—the weak in the hands of the strong. This is not only repugnant to the great principle of equality upon which our government is based, but is at war with every principle of justice and equity.

There are many other alterations and amendments to the present patent laws required, in order to adapt them to the wants and necessities of inventors and of the public; these have been so frequently alluded to by my predecessors in their annual reports, and so urgently recommended by them to the favorable consideration of Congress, that I deem it unnecessary to do anything more than to endorse the recommendation made by them.

The practice of the Office, however, has suggested one or two additional features, which have not heretofore been brought to the attention of Congress, but which deserve serious consideration at their hands. Under the 8th section of the act of July 4th, 1836, the Commissioner is required, whenever an application is made for a patent which would interfere with any other application already pending, or with any unexpired patent already granted, to declare an interference between the parties in order to establish the question of priority of invention. It has been held by the judges on appeal, and is now held by this Office, that he is the first and original inventor (within the meaning of the patent law) who first conceived the idea of the invention, and first gave such an expression to that idea, either verbally or in any other manner, as would enable any person skilled in the art to which such invention appertained, to construct therefrom a working model or machine. Scarcely a patent is granted which proves profitable to the inventor and important to the public, but that, under this section of the law, is brought into interference with subsequent applications. Thus not only the first patentee, but all those who have purchased rights under him, on the strength of Letters Patent issued by the United States, are liable to be deprived of their property, upon the testimony of witnesses, that a subsequent applicant for a patent for the same invention had conceived and explained to others the same idea, previous to the date of the invention of the patentee. The ease with which testimony of this kind can be obtained, and the liability on the part of witnesses to be mistaken in regard to the extent and details of an invention explained to them many years before, renders property in patents extremely precarious and uncertain. An honest and *bona-fide* inventor, who has expended years of labor and large amounts of money in perfecting and patenting an invention, and creating a market for it, is liable to be deprived of his property by any person who can find witnesses to swear that he conceived and described the same invention prior to the invention of the patentee. There is no species of property in the country subject to the same hazards and uncertainty as property in patents, subject as it is to the above-named contingencies. Neither are there any cases in which false testimony can be presented with as little liability to detection as in the trial of interferences, to establish priority of invention. The error in the law, as it now stands, consists in awarding priority to the person who first conceived and described the invention, and in giving no consideration to the *bona-fide* inventor who first reduces his invention to practice, or first notifies the Office of his invention, either by a caveat or by an application for a patent. As between two independent inventors, he certainly is entitled to the most credit, and best deserves the reward, who first reduces his invention to a practical shape and first gives the public the opportunity to use it. One man may conceive an invention and yet require years before he may be able to reduce it to practice. In the meantime, another, conceiving the same invention, may reduce it to practice, and present it to the public as a perfect working machine, secured by Letters Patent of the United States, before the first inventor has even commenced a drawing or written a description of the same. Still, in this case, the first but tardy inventor, by the aid of the very working machine of his more diligent rival, may finally succeed in reducing his invention to practice, and then obtain a patent for the same device, and thus render the well-earned property of the other perfectly worthless. In order to remedy this defect in the law, I would recommend that, in interference cases, he shall be deemed the first and original inventor, who, previous to the application of either party for a patent, first filed a caveat in the Patent Office, describing his invention; and in case no caveat is so filed, he who first presented to the Office and completed his application for a patent, shall be entitled to the patent, unless it shall appear (from the testimony submitted) that the person first filing such caveat or first making such application was not an original and *bona-fide* inventor of the device for which he seeks a patent. Such an amendment to the present law would work no hardship to an honest inventor, and would prove an effectual bar to a vast amount of perjury, while it would render the rights of patentees and of the public more secure. In addition to this, it would very materially reduce the number of contested cases before the Patent Office as well as before the courts. I believe this recommendation will be sanctioned by most men of standing and respectability who have been accustomed to the investigation and trial of patent cases. At the same time it is not at all improbable that a certain class of patent agents who seek to make profit by aiding dishonest men in annoying and robbing honest inventors of their just rights, rather than by an honorable practice of their profession, may endeavor to defeat any amendment of the law which will diminish litigation, fraud, perjury and corruption. It is a matter of regret that the present law affords so many facilities for the dishonest practices of such men, by whom innocent inventors are continually plundered.

The business of the Patent Office is rapidly increasing from year to year, as is evinced by the fact that the number of applications for patents during the year 1859 was nearly 60 per cent more than during the year 1855. Notwithstanding this, the number of principal and first-assistant Examiners remains the same. To these gentlemen is entrusted the examination of all applications for patents, in order to determine their novelty and patentability. The labor of performing this duty on every application for a patent must necessarily increase in proportion to the number of applications for similar inventions previously made. Hence it follows that the labor and time necessary to investigate, thoroughly, the novelty and patentability of an invention increase from year to year. Unless, therefore, authority is given by law for the increase of the number of these officers in proportion to the increase in the number of applications for patents, one of two evils must necessarily occur—either hasty and imperfect examinations, or great delay to the business. The former results in continual and almost endless litigation, while the latter would soon become so annoying and troublesome to inventors as to prevent them from seeking to obtain patents at all. Rather than suffer the business of the Office to become seriously delayed, we have been compelled to grant patents upon hasty examinations. As a natural consequence many things have been patented which ought to have been rejected. This difficulty must continue to exist unless Congress confers upon the Commissioner its authority to add to the force of Examiners from time to time as the necessities of the bnsiness require. As the inventors of the country pay for all the expenses of these examinations, it is no more than just to them that their business should be transacted properly and with dispatch. I would therefore recommend that such authority be conferred upon the Commissioner, subject, however, to the provision that the annual expenses of the Office shall in no case exceed the annual receipts.

For some time past, three of the principal Examiners have been withdrawn from their appropriate duties, and have been entirely occupied in the examination of appeals from the decisions of the Examiners in rejected applications for patents. In the meantime their duties have been performed by first-assistant Examiners. Under these circumstances it is no more than right that such first-assistant Examiners should be allowed the salary of principal Examiners, for the time that they have performed their duties. They have performed the duties assigned to them with credit and fidelity; and I earnestly recommend that they be allowed the salaries as suggested.

For several years in succession Congress has been appealed to by the Patent Office, by the public, and by the inventors of the country, to revise and amend our patent laws. These inventors are an intelligent, deserving, influential and important portion of our citizens, whose just demands and urgent necessities should no longer be disregarded. For other reasons, it is to be hoped that Congress will no longer delay taking such action on the subject as will fully meet the wants and necessities of the country.

The 14th section of the Act of Congress, approved

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March 3, 1837, and entitled "An Act in addition to an Act to promote the progress of Science and Useful Arts," requires the Commissioner "to report annually to Congress, in the month of January, a list of all patents granted during the preceding year, designating under proper heads the subjects of such patents, and furnishing an alphabetical list of the patentees, with their places of residence; also a list of all patents which shall have become public property during the same period, together with such other information of the state and condition of the Patent Office as may be useful to Congress and the public."

The 4th section of the Act of Congress, approved March 3, 1859, and entitled "An Act making Appropriations for the Legislative, Executive and Judical Expenses of Government for the Year ending the thirtieth of June, 1860," provides that "the Secretary of the Interior be, and he is hereby directed to cause the annual report of the Commissioner of Patents, on mechanics, to be hereafter made to the Senate and House of Representatives, to be prepared and submitted in such manner as that the plates and drawings necessary to illustrate each subject shall be inserted so as to comprise the entire report in one volume not to exceed 800 pages."

It will be observed, from the foregoing provisions of the law [of 1837], that the Commissioner is required to report annually to Congress:—1st, A list of all patents granted during the year preceding, and an alphabetical list of the patentees, with their places of residence; 2d, A list of all patents which shall have expired during the preceding year; 3d, Plates and drawings to illustrate each subject; 4th, Such other information of the state and condition of the Patent Office as may be useful to Congress and the public. Every effort has been made to limit the rise of the mechanical report, so that it might be embraced within 800 pages, as required by the law [of 1859]; but this is found to be a physical impossibility. The list of patents expired and granted during the year 1859 will occupy about 260 pages of the printed report; the drawings or plates necessary to illustrate each subject will require about 340 pages; while the claims and descriptions necessary to explain the drawings, and without which the report would be utterly worthless, will require about 1,200 pages more. This information, which is required by law to be reported, cannot therefore be published in less than 1,800 pages. We have thus been reluctantly compelled to present a report exceeding the limit prescribed by the last Congress by 1,000 pages, and have no doubt but that Congress, in view of these facts, will so modify the law that future embarrassments of this kind may not arise. Nothing is embraced in this report but such information as is believed to be absolutely necessary to enable Congress and the public to understand the condition of the Patent Office, and the character of the inventions which have been patented during the last year, while even this is condensed into the smallest space that the nature of the case will admit.

The Act of Congress approved February 5, 1859, entitled "An Act providing for keeping and distributing all Public Documents," authorized and directed a transfer of all matters pertaining to copyrights from the State Department to the Department of the Interior. The Secretary of the Interior has very properly placed this matter under the immediate supervision of the Commissioner of Patents. It therefore becomes my duty to call the attention of Congress to this subject. The object of the copyright law is to protect authors in the exclusive ownership and control of their own literary productions, in a similar manner to that by which inventors of mechanical improvements are protected in the exclusive enjoyment of their own new and original inventions. The law now requires a person who may desire to secure the benefit of a copyright, to make his application to the Clerk of the District Court of the United States for the district in which the applicant resides. The Clerk of the District Court is directed to keep a record of all such applications, and to transmit (at least once in each year) to this Office a certified list of such records and of all copies of books or other works deposited in his office in accordance with the provision of the copyright law. The copies of records and books, &c., thus received are to be preserved in this Office. The only fee paid by the person to whom a copyright is granted is a fee of fifty cents to the Clerk of the District Court; no provision being made by which the necessary expenses incurred by this Office, in taking charge of and preserving the records and books, are to be paid by them for whose benefit this law was established. I see no good reason why authors should not be required to pay these expenses in the same manner that inventors are required to pay the expenses incurred in transacting their business before this Office. Neither can I discover any good and sufficient reason why applications for the benefit of the copyright act should not be made direct to this Office instead of being made to the Clerks of the United States Courts. It is found to be impossible to conduct the business with uniformity and accuracy under the present system. This evil must necessarily continue to exist as long as the execution of the law is committed to the hands of so many different persons in various sections of the country. The law should therefore be amended in such a manner as to remedy this objection. The amount of fees to be paid by those who desire to avail themselves of the benefit of the copyright law should also be sufficient to meet the necessary expenses of the officer in attending to that particular branch of the public business.

WM. D. BISHOP.

Hon. John C. Breckinridge,
Vice-President of the United States.

AMERICAN NAVAL ARCHITECTURE.

Naval pre-eminence secures universal dominion over the wealth of the world; since whoever commands the sea commands commerce, and whoever controls the traffic of the nations commands the riches, the liberties and the happiness of the world. The superior qualities of American merchant ships are causing them to fast supplant the mercantile navies of every other nation, and our vessels are rapidly becoming the carriers for people of every clime. As much of the commercial greatness of the United States is due to our ship-builders and navigators, it will therefore, at all times, give us much pleasure to publish such written communications from practical men of the above class as we may deem conducive to the enlightenment of our readers, in regard to the progress of improvements designed to promote the advancement of maritime science, and in accordance with this resolution, we will now proceed to detail the general construction and peculiar points of three recently-completed vessels, which are considered to exhibit, in many respects, marked evidences of that excellence which always results from a perfect coincidence of action between the designing mind and the execntiug hand.

THE STEAMER "GEORGE ANNA."

This vessel has just left the hands of her builders, and will at once take her appropriate place on the route of her intended service, which is between the ports of Baltimore and Richmond, and occasionally to this city. Her dimensions, with particulars of engines and boilers, are given in detail below:—Length on deck, from fore-part of stem to after-part of stern-post, above the spar deck, 208 feet 6 inches; breadth of beam (molded), at midship section above the main wales, 30 feet; depth of hold, 10 feet 3 inches; depth of hold to spar deck, 18 feet, 3 inches; draft of water at load line, 6 feet; dimensions of engine space, 60 feet 4 inches; area of immersed section (at load draft of 6 feet) 169 square feet; tunnage, 574.

The *George Anna* is fitted with a powerful vertical beam engine; diameter of cylinder 44 inches; length of stroke of piston, 11 feet 6 inches. Diameter of paddle-wheels (over boards) 28 feet 2 inches; length of blades, 8 feet 3 inches; depth, 1 foot 10 inches; number of blades, 20.

She has one return tubular boiler, the length of which is 14 feet 6 inches; breadth of same, 14 feet; hight (exclusive of steam chimney) 11 feet 6 inches; and beneath this there are five furnaces—breadth 3 feet 6 inches, and 2 feet 6 inches; length of fire-bars 6 feet. There are 154 tubes above; number below, 4 arches. Internal diameter of tubes above, $3\frac{3}{4}$ inches; internal diameter of arches below, same of furnaces; length of tube both above and below, 5 feet 8 inches; diameter of chimney, 4 feet 6 inches; hight of same (above grate), 46 feet 3 inches.

The weight of her engine is 210,000 pounds; that of her boiler, with water, is 90,000 pounds; load on safety valve, per square inch, 30 pounds. She possesses a heating surface equal to 2,114 square feet, and, will consume $\frac{3}{4}$ of a tun of coal per hour. The maximum revolutions per minute, at above pressure of 30 pounds, are 22; and steam is cut off at one-half stroke; draft forward, 6 feet; draft aft, 6 feet.

The frame is of wrought iron plates, $\frac{1}{2}$ to $\frac{3}{8}$ of an inch in thickness; and they are fastened with $\frac{5}{8}$-inch rivets between every 2 inches; shape of frame I, 3 inches in depth by $\frac{3}{4}$ of an inch in width, and the same are 18 inches apart at centers. The number of strakes of plate, from keel to gunwale, are 11; the cross floors are 13 in number, and 18 inches in hight; they are molded at the throats 3 inches, sided $\frac{3}{4}$ of an inch, with angle iron on top, and shaped I; shape of keel U, and dimensions of same, 6 inches by half an inch. Her bunkers are made of iron. The boiler is located in the hold, and is protected from communicating fire by felt and iron; she does not use blowers.

This vessel has three water-tight bulkheads, a commodious promenade deck, and a large saloon cabin; also water wheel guards fore-and-aft. Her ceiling is of pine, $1\frac{1}{2}$ inches thick. She is fitted with one independent (steam) fire and bilge pump, is supplied with one bilge injection, and has valves or cocks to all openings in her bottom.

The builders of the hull and machinery are Harlan, Hollingsworth & Co., of Wilmington, Del. She is owned by Mr. George R. H. Leffle.

THE STEAMER "PENGUIN."

This steamer was built by the Commercial Steamboat Company; and has but recently taken her place on the route between New York city and Providence, R. I. We annex full particulars of hull, together with minute details of her machinery:—Length on deck, from fore-part of stem to after-part of stern-post, above the spar deck, 165 feet; breadth of beam (molded), at midship section above the main wales, 30 feet 8 inches; depth of hold, 10 feet; depth of hold to spar deck, 17 feet 6 inches; draft of water at load line, 12 feet; draft of water below pressure and revolutions, 11 feet 9 inches; length of engine space, 10 feet 8 inches; tunnage, 460. Her frame is made of white oak, chestnut and hacmetac; it is molded 14 by 9 inches, and 11 inches, and 26 inches apart at centers; depth of her keel, 14 inches.

The *Penguin* is fitted with a vibrating lever (Ericsson) engine; diameter of cylinders (two) 48 inches; length of stroke of piston, 2 feet 6 inches; diameter of propeller 11 feet 6 inches; pitch of same, 20 feet; length of blades, 4 feet 6 inches; number of blades, 4.

She has one return tubular boiler, the length of which is 20 feet; breadth of same, 14 feet 3 inches; hight (exclusive of steam-chests) 13 feet 6 inches; and beneath this there are three furnaces—breadth 4 feet each; length of fire-bars 7 feet 6 inches. There are 93 tubes, the internal diameter of which is $3\frac{1}{2}$ inches; length of same, 15 feet; and they possess a heating surface of 2000 square feet; diameter of chimney, 4 feet 4 inches; hight 20 feet 3 inches; the load on safety valve, in pounds, per square inch, is 30; maximum revolutions per minute, at above pressure, 70. The area of immersed section (at load draft of 12 feet) is 323 square feet; the cross floors are molded at throats 14 inches, and sided 9 to 12 inches.

This vessel contains three masts, and is bark-rigged. Her boiler is located on deck; she does not use blowers. She is fitted with one extra size independent (steam) fire and bilge pump, has bilge injections, and valves or cocks to all openings in her bottom.

The builder of the hull is C. H. Mallory, of Mystic, Conn.; the builder of the machinery is C. H. Delamater, of this city.

THE UNITED STATES STEAM SLOOP "NARRAGANSETT."

As much has been written relative to the disparagement of this new vessel, and as our naval authorities have dispatched her to a southern navy-yard, preparatory to making extensive alterations and modifications in her machinery, we regard it as essentially necessary that our readers should possess a correct knowledge of her dimensions, with particulars of her engines and boilers; the details will be found annexed:—Length on deck, from knighthead to taffrail, 208 feet 3 inches; length at the deep load-water line, 186 feet 6 inches; length for tunnage, 188 feet 6 inches; breadth of beam (molded) at midship section, extreme, 31 feet 6 inches; depth of hold, 14 feet 2 inches; depth of hold to lower side of berth-deck beams, 5 feet 11 inches; draft of water at deep load line, 10 feet 3 inches; tunnage (carpenter's measurement), 930.

The *Narragansett* is fitted with two horizontal back-action engines; diameter of cylinder, 48 inches; length of stroke of piston, 2 feet 5 inches; diameter of propeller shaft, $9\frac{3}{4}$ inches; diameter of crank shaft, in journals, $10\frac{3}{4}$ inches; maximum pressure of steam (in pounds) per square inch, 20; maximum revolutions per minute, at above pressure, 80; weight of engines 80 tuns (179,200 lbs.); the length of same, fore-and-aft of ship, is 13 feet 9 inches; breadth, athwart of ship, 15 feet 5 inches; they are supplied with an adjustable slide cut-off; diameter of screw, 9 feet 6 inches; length, $37\frac{3}{4}$ inches; pitch of same, 18 feet 2 inches; number of blades, 2.

She has two of D. B. Martin's vertical tubular boilers, the length of which are each 10 feet 2 inches; breadth, 18 feet 6 inches; hight of same (exclusive of steam drum), 10 feet 7 inches; hight (inclusive), 11 feet 6 inches; and beneath them there are 11 furnaces—breadth, 36 inches; length of grate bars, 6 feet. There are 3,190 brass tubes, the external diameter of which is 2 inches; extreme length of same, 32 inches; extent of grate surface, 200 square feet, and they possess a heating surface of 5,945.7 square feet; diameter of small pipe, 6 feet; hight of same, above grates, 50 feet; length of engine and boiler space, 49 feet 3 inches; length of

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shaft, above base line, 5 feet 4 inches. The area of immersed section (at load draft of 10 feet), is 253 square feet; displacement of water at load draft, 1,043.06 tuns; capacity of bunkers for coal, 194 tuns; description of coal used, anthracite; her draft is a screw fan.

This vessel contains two air pumps—one of salt water and the other of fresh; diameter of salt water pump, 18½ inches; diameter of fresh water pump, 13¾ inches. She is fitted with Pirsson's condenser, which contains 3,705 tubes; outside diameter of same, ⅝ of an inch; inside diameter, ½ inch; length, 4 feet 10 inches over all; and the tube sheets are ¾ of an inch in thickness. In addition to these, she has independent (steam) fire and bilge pumps of extra size, bilge injections, valves or cocks to all openings in her bottom, and all other necessary fixtures to make her a staunch and sea-worthy steamer. She is supplied with three masts, and is bark-rigged.

The hull was built by the United States government at the Charleston navy-yard; the builders of the engines and boilers are the Boston Locomotive Works.

BOWER'S ELEVATOR.

The elevator here illustrated is represented as raising water, though it may be used for other substances, equally well. The bucket, H, Figs. 1 and 3 is attached to the lower end of a series of lazy-tongs, G, the upper end of the series being connected with the inner arms of the levers, F. From the outer arms of these levers the ropes, D D, pass over the guide pulleys, E E, and are attached to the peripheries of the large wheels, C C, which are secured to the shaft, B. From this arrangement it will be seen that when a rocking motion is given to the shaft, B, by means of the handle, H, the bucket, H, receives a much greater motion either upward or downward vertically. To facilitate the filling and emptying of the bucket, the puppet valve, *d*, Fig. 3, is constructed in its bottom, and the sliding drawer, J, is arranged in the curb. When the bucket has been raised, the sliding drawer is pushed under it and the bucket allowed to descend into the drawer, when the projecting end of the valve rod pushes the valve upward, and allows the water to flow into the bottom of the drawer or spout, and out into any vessel placed properly to receive it.

The patent for this invention was obtained, through the Scientific American Patent Agency, Aug. 2, 1859, and persons desiring further information in relation to it will please address the inventor, Abraham Bower, at Pekin, Ill.

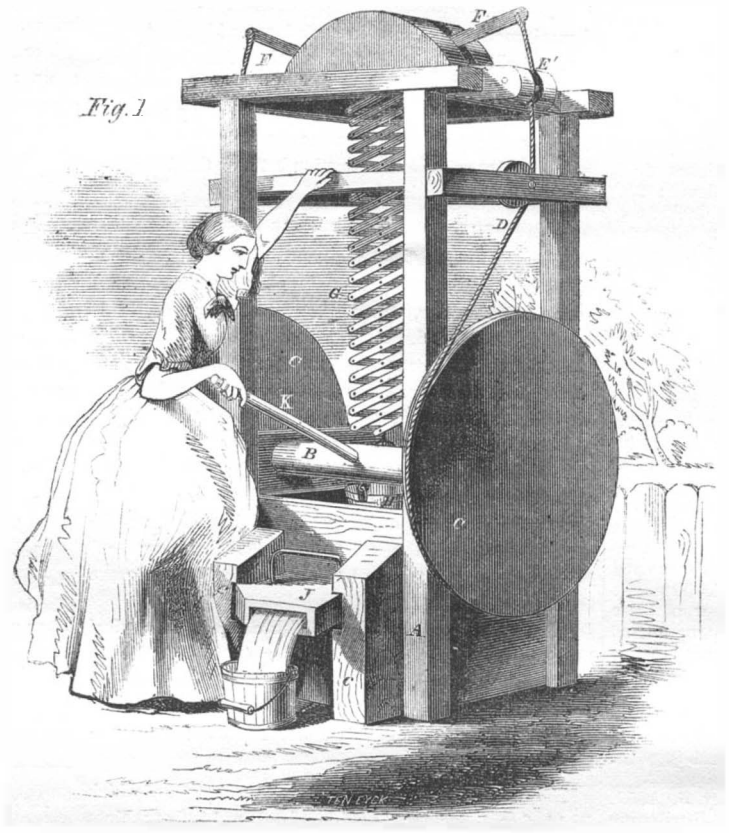


Fig. 2

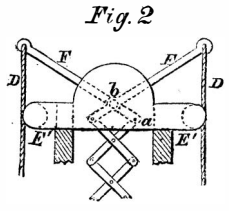
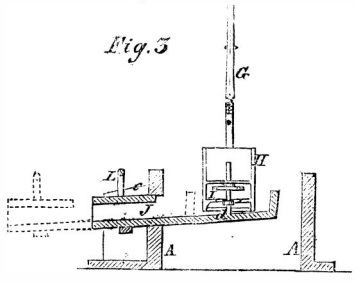


Fig. 3



BOWER'S IMPROVED ELEVATOR.

RAILROAD COLLISIONS—AN ENGINEER'S DEFENSE.

The coroner's jury at Greenbush, N. Y., having censured H. B. C. Miliken, the engineer of the defective locomotive attached to the train that was run into on the Hudson River Railroad (as noticed by us on pages 80 and 89), he has come out in a written defence of himself. The censure was to the effect that he did not comply with the rules of the company, which require that when a train stops, it shall be where there is a clear view of it both ways. He says it was impossible for him to do so; the steam pipe of his engine gave way when he was approaching the curve; and he was driven from his post by steam and gas, so that it was impossible for him to do his duty. We admit the force of this defence; but there is one point which has not yet been cleared up, and which has never been touched upon in the decision of the jury or in the evidence adduced, and yet it is the most important one of all, namely, why was a defective locomotive employed in running that express train? This was the primary cause of the accident. Some person should be accountable for endeavoring to run the train with an engine which had to be stopped several times for repairs, and then broke down in such a dangerous position. Is the Hudson River Railroad so miserably managed that there is not a spare locomotive on it, between Albany and New York, to take the place of a broken-down one? The public wants satisfactory answers to these questions.

BOILER INCRUSTATIONS—EXPERIMENTS TO REMOVE THEM.

We have received a letter from Mr. C. C. Halladay, of Utica, Ill., likewise a specimen of incrustation (which is more than half an inch in thickness) that was removed by the sole agency of slippery elm placed in his steam boiler. He says:—"I always put in sufficient of the elm wood to color the water in the boiler, and I renew it as often as it is found necessary to keep it in that condition. If the elm is used in sufficient quantities, it will convert the scale into a thick black mud, which is easily blown off. I always put in the elm blocks as large as I can get them. I have secured a saving of at least 25 per cent in fuel since I commenced using slippery elm in my boilers."

Another communication has been received from J. W. H., of Newark, Ohio, whose previous letter we published on page 55 of the present volume. He gives us some of his experience in regard to the use of different substances in his boiler, and says:—"Molasses was the first thing which I tried to remove the scale from my boiler, but it did not effect the object. I then tried molasses to see if it would prevent the *formation* of scale, and for this purpose it was equally ineffectual as in removing it, while it tended to produce foam. Next I used hemlock bark, and its results were similar; tried it three different times. This experience I related to a friend of mine, who advised me to try chestnut-bark, and in accordance with his suggestion, I put an armfull of it into the boiler, which is 36 feet long, and 3 feet 4 inches in diameter. After running it for a week, the water was blown off, and another armfull of this bark put in, and the boiler run again for two weeks longer, then blown off and run out. The man-hole plate was then removed, and upon entering the boiler the incrustation was found to be 1⅛ of an inch thick; so the barks had no effect whatever, either in removing or preventing the formation of scale in any boiler. This is a plain statement of my experiments with molasses and astringent barks to prevent and remove incrustations. I have found the *pick* to be the only effectual friend for removing scale, and I have given my experience for the benefit of others who may place too much reliance in molasses and other substances. It would no doubt be best to prevent the formation of scale altogether; you recommend the use of pure water—so do I; but how shall we get it when it is not to be had? The water which we have here may be filtered for any length of time, and yet it will form incrustations when used in boilers. That which we use is first run from the creek into a low reservoir, and from thence it is pumped into a second reservoir or tank 180 feet high, from which it is fed to the boiler situated 75 feet below. This I consider pretty good filtering; the tank holds 6,000 gallons. I am now trying potatoes in the boiler to see what effect they will have."

We understand that Newark, in Ohio, is situated on the magnesian limestone formation; and cold filtration will not remove the lime held in solution by the water in that region. The method of filtration which we recommended on page 55 of the present volume, embraces the use of the exhaust steam to precipitate the lime on the water before it is fed to the boiler. Several of our correspondents who have tried oak and hemlock blocks with success, in preventing incrustations, have informed us that "the remedy is worse than the disease." They complain that the gallic acid in these astringent substances, when set free in the boilers, attacks the metal, and soon eats it through at the rivets and joints. If this is so, then, of course it forms a most serious objection to the use of those substances. We do not think that slippery elm will be found so injurious as oak, chestnut or hemlock; but it is only by continued experiments that this can be fully determined.

IRON-MASTERS' CONVENTION.—A large convention of iron-masters, capitalists and others recently met in Portsmouth, Ohio, and nearly every furnace and iron interest in Kentucky and Ohio were represented. After organization, a statement was made of the iron interests of the two States, from which it appears that the average produce of pig-iron from 62 furnaces is 155,000 tuns per annum; value of cold and hot-blast metal, $4,650,000; population supported by furnaces, 31,000; hands employed, 6,200, &c. The committee to whom the matter was entrusted reported a memorial to Congress, in which they represent the iron manufacture in such a depressed condition as to render the capital invested scarcely remunerative, and that relief can only be afforded by a specific duty on the import of foreign iron. A series of resolutions were passed, alleging, among other things, that it is the duty of Congress to afford such protection as will infuse new life and energy into the iron trade of the country.

TENUITY OF SILK.—One hundred yards of the raw silk of the silk-worm does not weigh a grain; and it has to be doubled and twisted many times to form a fine thread for domestic use. Still finer are the fragile threads of the spider, which, proceeding from 4,000 holes in the little animal, are all twined together to form one slight gossamer line.

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PERSONAL EXPERIENCE IN TRANSPLANTING TREES—HOW WE DID IT AND THE RESULT.

We have had large experience, extending over many years, in transplanting young trees; and having learned a method which is almost invariably successful, we purpose to communicate it fully and clearly to our readers, very large numbers of whom are interested to a greater or less extent in the matter. Out of the first hundred trees that we bought, we lost thirty, and since that time we have transplanted several hundred in a season without loosing a single one. This is our plan:—Dig a hole two and a half feet square, and ten inches in depth, leaving the sides perpendicular and the bottom level, or with the edges a little lower than the middle. As the dirt is thrown out, have it beat up fine with the back of the shovel. Set the tree into the hole so that the roots will lie in their natural position without being bent, and if the hole is too deep for the tree, let a shovel-full of earth be thrown into the middle to raise the tree to a proper hight. Let such such parts of the hole be filled as are not occupied by the roots, care being taken to avoid bending the roots, or having them considerably covered with the soil. Now let two pails of water be poured into the hole, and while the tree is held in an upright position, let the assistant sift the fine dirt from his shovel slowly into the water. While this process is going on, the person who holds the tree should change his position to different sides of it, by which means he will be able to get it perfectly perpendicular. After the tree has stood for half an hour it may be examined, and if it leans at all, it may be brought to an erect position by pressing it over with the hand, and at the same time pressing the earth with the foot against the proper side at the roots. This method *deposits* the earth upon the roots in a manner somewhat analogous to electrotyping, embedding them more perfectly than can be done by any other mode. It also avoids the necessity of supporting the tree with stakes. When the tree is first set in the soft mud, it may be pushed over with the little finger, but after two or three hours, it feels as firm in its new positionas if it had grown there.

If the ground is not very rich, plenty of manure should be mixed with the earth about the tree; and in poor soil we have found it very advantageous to prepare a rich border for the tree during its early growth, by digging a hole four or five feet square and two feet deep, and filling it with manure and soil from the surface. It is also a good plan to mix manure with the water which is used in setting the trees. We think as highly as Mr. Downing did of mulching the ground, or covering it with straw to the depth of two or three inches and for a space of four or five feet around the tree. It is just as important to cultivate the ground about young trees as it is about corn; no weeds should be suffered to grow, and a tree might about as well be put into the fire, as to be set in grass land. All young orchards should be highly manured and cultivated. We once saw two acres prepared for a nursery for apple trees in Illinois. The virgin soil was covered three or four inches deep with strong stable manure, and the ground very deeply and thoroughly plowed and harrowed. The grafts (consisting of a scion three inches long, spliced to a bit of root four inches in length) were placed in this genial soil, and the ground through the season was thoroughly cultivated, not a weed being allowed to grow. As the grafts were so deeply inserted that only one eye was above the ground, when they were first set in the Spring, a person would not notice that there was anything in the field, but in the Fall, five months afterwards, if a tall man walked into the nursery he was so completely hidden by the trees, that it was impossible to see him; so rapid had been the growth.

Large trees also are benefited by an abundance of manure. In Smithfield, R.I., there is a famous apple tree which has yielded 40 bushels a year for several consecutive years, and the secret of its great fecundity is fouud in the fact that a flock of turkeys have roosted in its branches. But the most important thing for trees either young or old, is to keep the ground free from weeds and grass. It is true if the land is very rich indeed, it may bear part of a crop of grass and a moderate yield of fruit, but as a general rule the most unsatisfactory of all efforts of husbandry is the attempt to obtain both fruit and grass from the same field. Plant potatoes or corn, or anything that requires plowing and cultivation, and the trees will be benefited by it, but let them grow amongst grass and they will present a most mossy, wrinkled and sickly appearance, they will make a very slow growth, and bear very little fruit.

BURNING SAWDUST FOR STEAM BOILERS.

Messrs. Editors:—I noticed on page 71 of the present volume of your valuable paper a communication headed, "How to Burn Sawdust Satisfactorily," signed by I. H S. I have been building sawmills for 14 years and have tried many plans for burning sawdust, and now have a plan which I think is perfect. It is adopted in the last mill that I built, belonging to W. H. Depue, in Johnson county. The boiler is 40 inches in diameter, and 20 feet long, with two 14-inch flues. Two feet back of the grate bars we have an arch wall within four inches of the boiler, and beyond this wall there is a space of three feet under the boiler to its end. We have sheet iron doors to close the air chamber under the grates, in order to keep out the cold air when the grate bars become naked. With this arrangement we have no difficulty in keeping up steam with oak, beach, elm and sicamore dust; filling both sides of the furnace at once, closing immediately, and letting in but little air. I am satisfied that most mills let in too much air through their grates and furnaces to burn saw-dust to good advantage. The damper the dust, the less air does it require.

N. D. L

Franklin, Ind., Feb. 9, 1860.

A COMMON ERROR AMONG ENGINEERS.

Messrs. Editors:—If steam at 80 lbs. pressure is admitted to a cylinder and cut-off when $\frac{1}{4}$ of the stroke is performed, it will expand the remaining $\frac{3}{4}$ and its pressure be reduced to 20 lbs., according to the common opinion among engineers; but this is an error, the true pressure without any allowance for condensation would be $(80+15\div4)-15=8\frac{3}{4}$ lbs. on the same steam gage that measured the the 80 lbs. initial pressure. Suppose a non-condensing engine working steam at 35 lbs. cuts off at $\frac{1}{4}$ stroke, the pressure at the end of the stroke is $2\frac{1}{2}$ lbs. below the atmospheric pressure, that is, there will be a partial vacuum in the cylinder before the end of the stroke, tending to run the engine backwards. An engine, therefore, cutting off at $\frac{1}{4}$ stroke should carry over 35 lbs. of steam, and all engines working cut-offs controlled by the governor should carry at least 100 lbs., otherwise in cutting-off very early they would form a vacuum in the cylinder to the disadvantage of the engine. Some engineers will not believe that a vacuum can occur in a high-pressure engine.

D. S.

San Francisco, Cal., Jan. 10, 1860.

CLARIFYING COAL OILS.

We translate from *Le Gènie Industriel*, the following: "Messrs. Dumoulin & Cotelle, have been making a series of experiments with a view of rendering heavy oils suitable for ordinary lighting puposes, and have succeeded in producing a magnificent light, free from smoke and smell, and adapted in all respects for burning in a close room. The following is their process:—In a close vessel are placed 100 lbs. of crude oil, 25 quarts of water, 1 lb. of chloride of lime, 2 lbs. of sal soda, and half a pound of manganese. The mixture is violently agitated and set to rest for 24 hours, when the clear oil is decanted and distilled. The 100 lbs. of coal oil are to be mixed with 25 lbs. of resin oil; this is one of the principal points in the manipulation, it removes the gummy parts from the oil and renders them inodorous. The distillation spoken of may terminate the process, or the oils may be distilled before they are defecated and precipitated."

Incombustible Crinoline.—At a recent meeting of the Pharmaceutical Society in George-street Hall, Edinburgh, Dr. Stevenson Macadam exhibited a crinoline dress, one half of which had been immersed in a solution of sulphate of ammonia, in order to test its non-combustibility. On a light having been applied to the crinoline, the part of it which had not been steeped in the solution was at once enveloped in flame; but the only effect which the light had on the other part was to char it. This was considered a satisfactory experiment; and it was stated that as ammonia was only twopence per pound, it was accessible to the humblest classes.

SPONTANEOUS COMBUSTION IN A FLOUR MILL.

Messrs. Editors:—I send you the following account of a peculiar accident by fire which took place in my flour mill in the month of September last. The cause of it still remains a mystery to me; perhaps you can explain it. The subject is one of deep personal interest to millers and mill-owners, and for this reason I send this letter, as well as for my own satisfaction.

The spout in my mill, which conveys the meal from the stones to the elevators, passes through the floor (above which it is closed) into the foot of the elevators. Below the floor, for a distance of about two feet, the spout is open to allow the steam that is generated, when grinding damp wheat, to pass off. The distance from the floor where the spout passes through, to the ground on which the foot of the elevators stand, is about four feet. While the meal is passing down the spout, a very fine dust escapes with the steam, and falls on the ground at the foot of the elevators. The vapor or steam generally condenses on the under side of the floor, and drops down upon the fine dust on the ground. About four bushels of this dust had accumulated into a heap when, one morning about six o'clock, as the engineer and myself entered the mill, we found it filled with a dense black smoke, which caused us to search for the fire with considerable alacrity and fear. We first found smoke issuing from around the curb of the stone, which caused us to conceive that the bush in the bedstone was burning. On opening the meal-spout, however, we saw the smoke ascending through it, and when we opened the trap-door in the floor we found, to our great surprise, the heap of flour dust which I have already mentioned on fire. It was not blazing but was a mass of fire in the inside, with the outside not quite burned. The question with us was, "How did this catch fire?" No person had been under the floor for two weeks; and there had been no fire whatever within 30 feet of the spot, nor could it have taken fire from any fire on the premises. At one time I thought that a nail or some piece of metal might have passed through between the burr stones and had become heated: then had fallen over the edge of the spout and set the flour dust on fire. To try whether this would have caused such a result, I heated a piece of iron red-hot and thrust it among some such dust, but it would not take fire. I then put some red-hot coals among the flour, when these were extinguished also. The conclusion at which I have arrived regarding the cause of this fire is, that it was due to spontaneous combustion; some of my scientific friends, however, consider that this could not have been the cause. Will you, then, Messrs. Editors, be pleased to give your opinion? We generally find it correct.

C. D. G.

Greenbush, Wis., Feb. 16, 1860.

[This is a serious and interesting matter for millers. If the dust-heap in our correspondent's mill set itself on fire (took fire spontaneously), then all millers should be careful not to allow such heaps to accumulate. Spontaneous combustion does not take place very often; but there is no fact better established than that certain substances, under peculiar circumstances, will thus take fire. We are of opinion that the dust-heap in our correspondent's mill took fire spontaneously. It perhaps had imbibed a certain amount of moisture, which tended to produce active decomposition, and this was concentrated in the interior until active combustion resulted.—Eds.

Gardiner's Galvanic Gas-igniter.—On page 320, Vol. XII. (old series), Scientific American, we published an illustrated description of Gardiner's apparatus for lighting gas by electricity. We are pleased to learn that this improvement is being rapidly introduced, and that it is in all cases perfectly successful. In 1858 it was applied to 1,500 jets in the United States Senate Chamber, where it has been in use to the present time, *never* having failed in a single burner. At the last fair of the American Institute, the wires were arranged on the large chandelier in the main hall, and the gas was turned off and on, and lighted from 50 to 100 times each evening, without making a single failure. It is now in use at the exhibition of the model of Solomon's Temple, at the store of Messrs. Tiffany & Co., 550 Broadway, at Mr. Belmont's picture gallery, for lighting the stage at the Academy of Music, and in a number of private houses; in all cases working successfully and giving perfect satisfaction. The inventor says that it is peculiarly adapted to lighting street lamps in cities.

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Wednesday evening, the 1st inst., a meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; the chairman (*pro tem.*) being John Johnson, Esq. During the hour for miscellaneous business, Mr. Garvey explained his *gyrometer*, for rendering the motion of the earth visible. Different opinions were expressed by the members regarding the possibility of obtaining correct results from it.

The chairman called for the pre-arranged subject of the evening's discussion—"Lead." No written report was presented, and therefore the members proceeded at once to the

DISCUSSION.

Mr. Seely:—"Lead was known in the time of Moses, and was in common use among all the more civilized nations of antiquity. It is said the Roman ladies used white lead as a cosmetic. The aborigines of America were well acquainted with the lead ore, and used it for ornaments; but they had not the cunning to discover the very simple process of changing it into metals; it is only necessary to throw the ore into the fire, and the lead runs out. This ignorance of lead is remarkable, as the Indians had some skill in working copper, having mined it to the depth of 50 feet. Lead is found in nature combined or associated with all other elements; but with the exception of the combination with sulphur, in quantities only about sufficient to supply the cabinets of mineralogists. The valuable ore is sulphide of lead or galena. Galena always contains silver. In England, and on the continent, nearly all the silver produced is from this source. In America, we have the true silver ore. Galena is found in nearly every State in the Union; and in nearly all the eastern and middle States lead-mining has been carried on, but unsuccessfully, from lack of skill or the poverty of the ore. Most of this mining originated in stock-jobbing speculations. The mines are now, with one or two exceptions, abandoned There is an abundance of lead at the West, and especially in Wisconsin and Missouri. There are two methods of reducing galena: first, fusion with iron —the iron takes away the sulphur; second, by a judicious roasting, converting the sulphide into a mixture of oxyd, sulphide and sulphate, when, by raising the heat, the whole of the sulphur and oxygen pass off as sulphurous acid. The first plan is generally indicated by a silicious gangue. The second plan has many modifications. No metallurgical operation requires more chemical skill than the profitable smelting of lead."

Mr Seely's remarks were illustrated by specimens from New York, Tennessee, Mexico and Arizona. Most of the observations following were elicited by inquiries from the various members; the speeches were brief and familiar.

Dr. Wetherbee:—"A writer in a recent medical journal states that he has observed all the effects of lead-poisoning from camphene alone, and that he believes many cases of lead-poisoning, so called, are due only to camphene."

Dr. Young:—"Nothing is better understood among physicians than that lead is a poison. Most danger is to be found from lead in warm weather. Heat always increases evaporation and solvent action. I recommend to the club the perusal of Metcalf's treatise on caloric."

Mr. Seely:—"Lead, as a metal, is not soluble in anything. Oxyd of lead, to a small extent, dissolves in pure water; if water contains chlorides or nitrates or free acids, of any kind, much more. There is little danger from water containing neutral carbonates or sulphates. Lead is volatile, especially when oxydating. Everything about smelting-works absorbs the lead—earth, plants and animals. Lead poisons a cat, but not a dog or a rat. Rats will play in white lead as they do in flour. Some men are not poisoned, however much exposed. The antidote for lead-poisoning is sulphur, internally or externally.

Dr. Wetherbee:—"Also iodine; various iodides are recommended. Iodide of lead is lately much used in the treatment of indolent ulcers. Compounds of lead are among our most useful medicines."

Dr. Geisenhainer:—"Lead wire is much used by horticulturists about their trees. It is cheap, easy to handle, and accommodates itself to the growth of the tree."

Major Serrell:—"The veins of galena, at the West, are scattered in branches, and are not very deep. Veins in New York are but a few inches in width. Mr. Chas. Chotan, of St. Louis, informed me that he discovered, in September last, near the head-waters of the Missouri, a mass of galena six miles in length, 10 to 30 feet wide, and protruding above the general level four to six feet. Mr. Chotan was one of the United States exploring party of engineers."

Mr. Fisher:—"Lead is used for the packing in iron joints. How are the metals affected?"

The Chairman:—"Lead is much used for the purpose. The iron suffers, especially near the joint. Wrought iron is most affected. Sulphur is sometimes used, and the iron is better preserved."

Mr. Fisher:—"How about steam joints?"

Major Serrell:—"Lead was once much used for steam joints, but good machinists now match joints so truly that packing is not needed."

Mr Seely:—"Lead is an electro-negative towards iron; so when the metals are in contact, the iron must suffer. In the air or steam, the iron would be most affected near the lead; but immersed in water, the corrosion would take place in all parts. Lead paint is bad for iron; the lead is reduced and acts as an electro-negative—ochre or other mineral paint should be used."

The Chairman:—"The specific gravity of lead is not increased by hammering."

Mr. Fisher:—"Expands by heat, and on cooling does not contract to its original volume."

The Chairman:—"Lead pipes for hot water always lengthen and sink down; I have noticed it a hundred times. Tin pipe is worse; tinned lead pipe is not now used. The tin soon wears off. Some metals are transparent in the melted state, especially zinc."

Major Serrell:—"It was said in Brooklyn, when the inhabitants were getting their lead pipes, that new pipes were not so strong as old ones. New-drawn iron wire is not so strong as when it has lain at rest for some time."

Mr. Selleck (an iron-master):—"I think the reason is that the acid used in cleaning is not all removed. Acid remains in iron a long time, and it penetrates the iron."

Mr. Fisher:—"Would you use washed wire for a bridge?"

Major Serrell:—"No; I would avoid it. I do not approve of washing even castings with acid."

Mr. Babcock:—"Castings will retain a sensible amount of acid after a week's washing in running water."

The Chairman:—"Steel-workers lay by their ingots for six months before working them up."

Major Serrell:—"It is the general voice of iron men that iron increases in strength after drawing or rolling. This fact is established. Ulster iron assumes its maximum strength before the Pennsylvania iron."

Professor Hendricks:—"I think the explanation of the fact to be that the particles of the iron, being forced out of their natural position, require time to settle themselves."

Mr. Seely:—"Lead makes a mark on paper by virture of its softness and lack of cohesion. Wax is softer, but makes no mark."

After a few more remarks of no special importance, the members adjourned.

BREAD AND ITS ADULTERATIONS.

On Thursday evening, the 9th inst., another meeting of the above-named association was held; the chairman being Professor C. Mason.

Mr. Grow introduced the subject for discussion—"The Adulterations of Wheat, Flour and Bread"—by reading a paper, the substance of which was as follows:—Of the grain wheat he could not say anything, but the flour bearing the brands "extra" and "double extra" could not be characterized pure when proceeding from the manufacturers and inspectors; there should be government inspectors whom dollars could not bribe. Virginia alone bears the same high character as it did 50 years ago, and commands the highest market price for flour. Bread might be divided into leavened or loaf bread, and unleavened or ship bread, including the small crackers. Previous to the war of 1812, a general characteristic of the bread in this city was heavy, but never sour; if it was found wanting in weight or quality, the official inspector sent it the poor-house and fined the baker ten cents per loaf. The tariff of the price of flour was regulated each week. The flour of New York State contained more gluten than that of Virginia and some other places, and, consequently, in its manufacture into bread, the bakers often made twelve pounds difference to their advantage in the hundred weight. Potatoes have been combined with the flour, and its effects are seen in stale bread, when broken, by elastic strings, and gives an odor not "resembling that of roses." He attributed sour and bad bread not so much to the flour as to carelessness and ignorance of its makers. Yeast bread is little more than half baked, which renders it indigestible. Unleavened or ship bread has had a great revolution in its mode of making by machinery within the last ten years, and its quality had become better; and he had seen bread baked in ten minutes, in 1845. The effect of plaster-of-Paris in bread is to make it elastic, and meal makes it clayey. Soda biscuit is both leavened and unleavened. A baker in Massachusetts one day, on returning home, found his bread had soured. He added some pearlash to neutralize the acid, and baked them and sold them under the name of "Medford biscuit." They became popular soon after in Boston and other cities. He would say that almost every grocer was now selling that biscuit, which was poisonous.

Dr. Stevens said if ten pounds of sour dough were made into bread, in which was one ounce of saleratus to sweaten it, the carbonic acid, to raise it, would be separated, and the alkali (which is a poison) left in the bread. A person in traveling through the western and southern States, where they use an enormous quantity of potash in their corn bread and short cakes, and in the northwest, where they make "mille-risings" and use an inordinate quantity of soda and pearlash, will find that it is the uniform experience of physicians that their patients suffer from some acute and chronic irritation of of the mucus tissues of the bowels, and it is almost impossible to raise the patient unless some one can give them yeast bread.

Mr. Treadwell said notwithstanding the statement given by the gentleman who first spoke on this subject, he would state that what are termed soda bread or biscuit was not first made in Massachusetts. In 1820 he shipped soda crackers to South America and elsewhere, and they were popular in Philadelphia and New York. Their soda biscuit and butter crackers were made by yeast; but in 1822 a great cry was raised in Philadelphia that they were made of soda. Pearlash and saleratus were used, but no soda. They were recommended by physicians, and became the more popular.

Dr. Young said that half-baked bread, though taken in moderation, is accumulative in its effect, and is a great agent for dyspepsia. Wholesome bread must dissolve rapidly in the stomach; it must be made a milky fluid, but half-baked dough will not allow the saliva to impregnate it sufficiently. The consequence is that the fermentative process goes on before the digestion is complete. On the other hand, a mouthful of stale bread gives a different impression to the taste to fresh bread, which will not dissolve so readily, and its effect is bad.

Dr. Stevens said that the tendency of the alkali was to make a pallid complexion, as he had noticed in the people of western countries.

Mr. Curtiss thought it might be the effect of too much calomel. (Laughter.)

Dr. Stevens said the evil effects of acids might be so neutralized that it would not be perceived for a time, as the coats of the stomach are adapted for it; but is a great abuse.

Mr. Seely:—"One of the oldest arts is bread-making; but it is not understood by the best chemists of the present day. The chemistry of it is that all the grains are nearly of the same constitution; they are mostly composed of gluten and starch, oil and vegetable albumen, and about one per cent of inorganic matter. The constituents which are most useful as nutriments for the body are the gluten and the starch, and it has been settled, lately, that the starch in it is for the respiratory system; the gluten is the true nutricious matter of bread. A mechanical mixture of water, starch and gluten, if baked without any other preparation, makes what is termed an unmalted or heavy bread; if you put in leaven you have fermented bread. The mass is just made larger, and the surface exposed to the air is larger The only reason why leaven bread is more healthy than unleavened bread is that a greater surface is made for the action of the gastric solution. Take fresh bread; the glutenosity of the dough is not entirely lost, and by

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pressing it together you reduce it into a putty state; the gastric juice cannot dissolve it so soon. It is just the difference between pulverized sugar and a lump of it. Take a crystal of rock salt and put it in water, and it takes a longer time to dissolve than if pulverized; and there is the same difference between leavened and unleavened bread. Almost within the last ten years there has been a revolution in making bread. The ancient leaven bread was made by the dough being left in a warm place till it began to ferment; and the chemical progress is the change of the starch first into the sugar, and the sugar into carbonic acid and alcohol; the carbonic acid and alcohol forming between the particles swells them up. But great care was required in the operation lest it be decomposed, and therefore the modern process by yeast is much more preferable. Within the past ten years, besides yeast in making bread, we have had 'baking powders' and 'self-raising flour,' and many others; and ninety-nine families in a hundred use some of these. The effect is the same as far as lightness is concerned, but foreign substances are added. Physicians know its pernicious and its dyspeptic tendencies. If the carbonate of soda were pure, there would be a great difference; but neither it nor the cream-of-tartar used are pure. Alum was used considerably in bread-making ten years ago, but not so much recently; its object is to whiten the bread. Baker's bread, generally, is lighter and whiter than home-made bread; the whiteness is produced by alum, and the poorest flour may be palmed off for superior brand. Mr. Hassen, in London, once made a thorough examination of this subject, and made a sensation almost as bad as swill milk in New York. He examined twenty specimens from different bakers, and found none that did not contain alum to an injurious extent. Besides alum, carbonate of ammonia is also used to raise the dough. Any kind of gas would answer the same purpose, even atmospheric air. But this gas, by means of heat, raises the bread in as good a way as any, but some of the carbonate is left in the system. The reason why potash is used to so great an extent in the West is the fact that there is so much wood; and there is such a demand for potash and pearlash that they manufacture these alkalies from the ashes of the wood."

Professor Hendricks, in illustrating the preceding remarks, said the sour substance in the dough is the acetic acid; it is not owing to the presence of the acid, but the change which the acid has made in the bread itself.

Dr. Stevens said it had been doubted whether plaster-of-Paris was added to flour; but it is true. Several officers of the United States Army had told him that, some years ago, a quantity of bread was sent to supply the garrison on the frontier; and upon opening the bags of bread they could smell the plaster-of-Paris. High authority in England had also found it. A foray should be made against the adulterations of tea and coffee, which have become indispensible; and so with spices; and so with fermented liquors, and especially wine, and other stimulants, which are always good in their place.

STABLE MANAGEMENT OF A HORSE.

It is one thing to own a horse, but it is another thing to know how to take care of him. The Woodstock (N. B.) *Journal* gives a few practical hints on this subject which are worth remembering. A stable horse needs special care and attention. His feeding must be as regular as the measurement of the hours. When a change of feed is made it must be done with great care—giving a small allowance at first until the stomach becomes used to the change. He must be cleaned every day; and when we say *cleaned*, we mean all that can be conveyed by that word. A good currycomb, brush, and an oiled woolen cloth, are the utensils necessary. First take the currycomb and begin at the top of the neck, back of the ears, working the hand both ways. Proceed in this way till you have gone over the entire body and legs. Then take both comb and brush, and every other stroke, draw the brush across the teeth of the comb to clean it. An experienced groom will do this instantly. This done, take your cloth and lay the coat and remove the dust which adheres to the outside. The face and ears must also feel the brush.

Few men know how to clean a horse properly. If the above directions are followed daily, your horses will enjoy good health generally. Stabled horses must be exercised daily. This is absolutely indispensable to good health. If the feet of your horses are brittle and liable to break and crack, they must be well oiled once a week. A horse thus treated will always be ready to go when wanted, and you will not be ashamed either to ride or drive him.

Another thing quite as important is a clean and well ventilated stable. We cannot excuse any farmer or horse owner, who does not clean his stable twice a day. A stable should be so constructed as to have a wide passage way or floor in front to feed from. Above the manger a space should be left a foot or two in width clear, and the passage-way should be the avenue for the supply of fresh air to the nostrils of the horse.

A horse enjoys a good bed, and it should never be refused him. At night take your fork and make it up light, and you will feel amply rewarded for the humane treatment you have given your beast.

DAMAGED HAY AS CATTLE FEED.

There is nothing more common among some of our farmers than moldy hay; and many—perhaps the most—of them do not seem to be aware of its bad qualities. It is chiefly caused by putting the hay into the barn before it is sufficiently dry; it then heats in the binn, and moldiness is the result. Blue mold has a musty smell, and cattle do not like it, but will eat it when they can get nothing else. Blue molds—*aspergillus glaucus* and *aspergillus moniliferus*—belong to the *fungi*—a poisonous group of plants which feed upon the most nutritious part of hay, and convert it into unwholesome matter. We have known some careless farmers to feed large quantities of such hay to their cattle during winter, and they actually seemed to grow poorer under the infliction of increased quantities of such provender. Young cattle, especially, are much stunted in their growth by such feed; being more tender than old stagers, it does not seem to assimilate with their system, although they may consume large quantities of it when well salted. One tun of good sweet, well-cured hay is worth three tuns of musty stuff. Many of our farmers lose a number of young cattle every winter, simply from feeding them with musty hay; and they do not appear to be aware of the fact. At the present moment, we have no doubt, there are thousands who have great quantities of musty hay in their barns, and they are feeding it out, unconscious of its vitiated character. We have a little bit of advice to give all of them. Do what you may with such hay; you cannot restore it to a good condition; still, you may partly remove its disagreeable taste to cattle, and thereby render it more palatable to them, and they will thrive better upon it. Steam all such hay (for food) in a kettle, for about an hour, and feed it out with some turnips, boiled oats, potatoes, or—what is better—Indian corn meal. In no case feed such hay exclusively to cattle.

THE SCIENTIFIC AMERICAN AND THE HON. JUDGE MASON.—From a glance at the weekly report of the doings in the Patent Office at Washington, one is astonished at the march of invention and improvement in the useful arts of the present day. The patents issued for various useful improvements in the United States amount to several thousands annually. The country is largely indebted to the SCIENTIFIC AMERICAN, and the Patent Agency of Messrs. Munn & Co., the publishers, for the light and encouragement extended by them to the inventive spirit of the age. As a scientific and mechanical journal the SCIENTIFIC AMERICAN has no equal in any language; and the universal satisfaction given by the proprietors as agents in procuring patents has secured to them a large proportion of the entire business at the Patent Office. Besides their central office in New York, they have one in Washington, near the Patent Office, and they are also largely engaged in procuring patents in all foreign countries. So extensive has their business become, that we are pleased to see it announced that the Hon. Judge Mason, late *Commissioner of Patents*, has become associated with them in the business. The country could hardly have furnished a gentleman more competent for so important a position. No class of our citizens are reaping more largely the benefits of the inventions of the age than the farmers.

[We copy the above very friendly notice from the *Valley Farmer*, published at St. Louis, Mo. We recognize in it the hand of our old and esteemed friend, H. P. Byram, who is associated in the editorial management of that journal.—EDS.

A COLUMN OF VARIETIES.

Scott Russell, in his report to the great ship company, says that Portland, *in Canada*, is open to her.....The cost of running the *Great Eastern* is $10 per mile, including every expense; and if she could have regularly 2,000 passengers at $30 a piece between here and England, she would pay a profit, on passengers alone, of $30,000 a trip.....In China, so carefully is every material for manure husbanded, the barbers save the soap which they have used for shaving with the bits of beard and the hair taken from their customer.....It is said that linseed meal is a good food for hens, causing them to lay, especially in the winter, when it serves as a substitute for worms and other animal food. If mixed with scalded meal or shorts, or with sour milk, the hens will eat it readily.....All ground where melons are planted should be mulched before the vines begin to run. You may use old hay or straw, or even small bushes, if they will lie down flat.....Ten years ago, the average wages of plowmen in Aberdeen, Scotland, were $80 a year, with board and lodging; now they are $110..... If the iron manufacture of the United States continues to increase at its present rate, a very few years will suffice to stop all importation.....About the average velocity of the piston in a steam engine is 220 feet per minute; this is 2½ miles an hour.....One pound of the best coal is required to heat 5½ lbs. of water from the freezing point and convert it into steam.....In 1841 it took, on an average, from 11 to 13 lbs. of bituminous coal an hour to a horse-power. Some large engines now run with less than two pounds.....The difference of time between high water averages about 49 minutes each day.....The lightness of bread mixed with snow, in place of water, is produced by the gases which have been absorbed by the snow.....A Boston manufacturer produces annually, from grapes grown on Charles river, 20,000 gallons of wine. Connecticut makes 200,000 gallons of wine, and Ohio 80,000 gallons each year.....Strawberries have been produced at the rate of 160 bushels per acre, worth $1,300. .....There is a pear orchard in Mississippi containing 15,000 trees.....One gentleman at the South sends to the North, annually, from $7,000 to $10,000 worth of peaches.....The Bartlett pear is an old French variety—Bon Chrétien (Good Christian).....The following varieties of apples are recommended by the American Pomological Society for general cultivation:—American Summer Pearmain, Autumn Bough, Baldwin, Benoni, Bullock's Pippin, Carolina June, Danvers Winter Sweet, Early Harvest, Early Strawberry, Fall Pippin, Fameuse, Gravenstein, Hawley, High Top Sweeting, Hubbardston Nonsuch, Jonathan, Lady Apple, Ladies' Sweet, Large Yellow Bough, Melon, Minister, Monmouth Pippin, Porter, Primate, Rambo, Red Astrachan, Rhode Island Greening, Roxbury Russet, Smith's Cider, Summer Rose, Swaar, Vanderveer, Wagner, William's Favorite, Wine Apple, Wine Sap.....A young orchard of 400 pear trees, owned by Mr. Chapin, produced in 1853, eight years from planting, $450; and in 1854, $1,000..... Judge Howell, of Canandaigua, has a Vergaleu pear tree 70 years old, which has not failed of a good crop for 40 years, averaging for the last 20 years 20 bushels a year, sold on the tree for $60. This tree has produced for the New York market $3,750 worth of pears.....When the peach crop is destroyed it is generally caused by the extreme cold in winter, about 18° below zero killing the blossom buds. It is easy to ascertain whether the buds are killed, by cutting them transversely through the middle, when, if they are alive, they will be found to be green throughout; but if they are dead, a black speck will be seen in the heart.....It is estimated that the value of the tobacco crop in Connecticut averages $300 per acre each year.....There are in France about 4,000,000 acres of land devoted to the cultivation of the grape, yielding in favorable seasons about $140,000,000, equal to $34 per acre.....The charter of the East India Company was signed by Queen Elizabeth on the last day of the 16th century, and this greatest of all commercial companies ceased to exist on Sept. 1, 1858.....The present is the 18th Imperial or 8th Reformed Parliament. The House of Lords consists of 462 members, the House of Commons of 654.....Europe is divided into 55 governments, 5 of which are republics and 5 absolute monarchies.....The salary of the Lord High Chancellor of England is $50,000 per year. Lord Campbell is the present incumbent of this high office.

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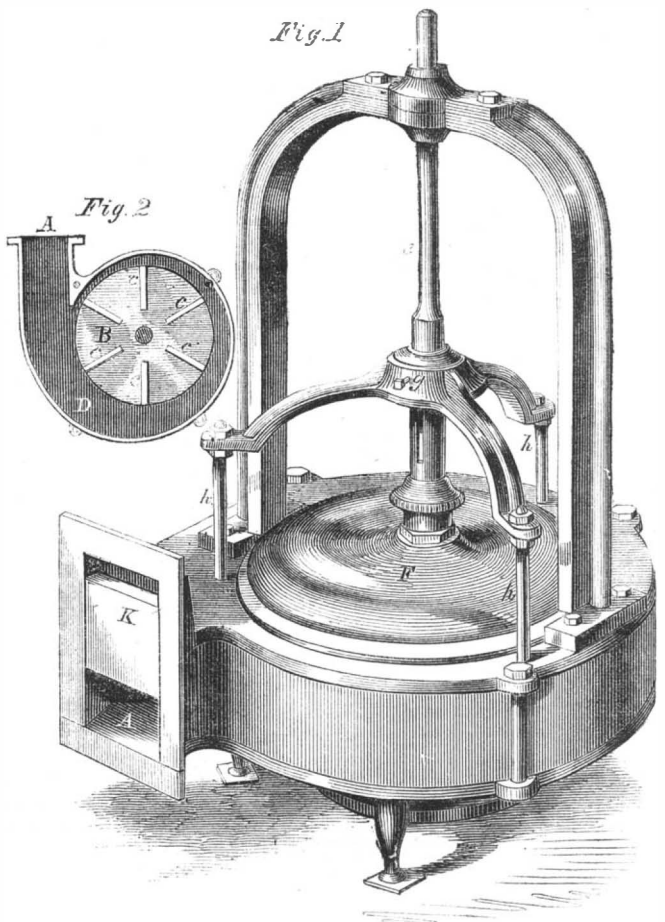
IMPROVED WATER WHEEL.

Among that large number of persons who have been studying the turbine water wheel, considerable attention has been given by many to the problem of regulating the power by varying the capacity of the wheel, and the accompanying engravings illustrate an invention in which this is accomplished.

Fig. 1 is a perspective view, and Fig. 2 a horizontal section, the improvement consisting of a modification of the center-vent wheel with radial buckets. The water enters at A, and passes through the bottom at the center, being forced into the wheel, by the eccentric scroll which surrounds it, acting on the radial buckets, *c c c c*, in its passage, and thus turning the wheel. The plate, B, which forms the top of the wheel, has a vertical motion, which, in connection with a corresponding motion of the plate, D, which forms the top of the channel, varies the capacity of the wheel by varying its vertical depth according to the power required; the slits in the plate, B, for the buckets being sufficiently wide to permit the plate to slide up and down without any considerable friction. These motions are effected in a manner by which they are made to conform to each other. The plate, B, is fastened rigidly to a rod which extends up the inside of the shaft, *e*, the lower part of which is made hollow for the purpose. At the top of this inner rod a pin passes through it, and runs in a groove in the sleeve, *g*, and at the ends of the arms of the sleeve, *g*, are the three rods, *h h h*, to the lower ends of which the plate, D, is attached. By raising or lowering the sleeve, *g*, a corresponding motion is given to the plates, B and D, and thus the depth or capacity of the wheel is varied. The gate, K, is fastened to the plate, D, and moves with it, thus adjusting the supply of the water to the size of the wheel.

In order to counterbalance the upward pressure of the water against the wheel, which would increase the friction of the bearings, the water is let in through the passage-way, L, upon the top of the wheel, the pressure being thus taken by the top of the case.

Application for a patent for this invention has been made through the Scientific American Patent Agency, and persons desiring any further information in relation to it will please address the inventor, Robert Ross, at St. Albans, Vt.



ROSS'S IMPROVED WATER WHEEL.

LAWRENCE CALAMITY

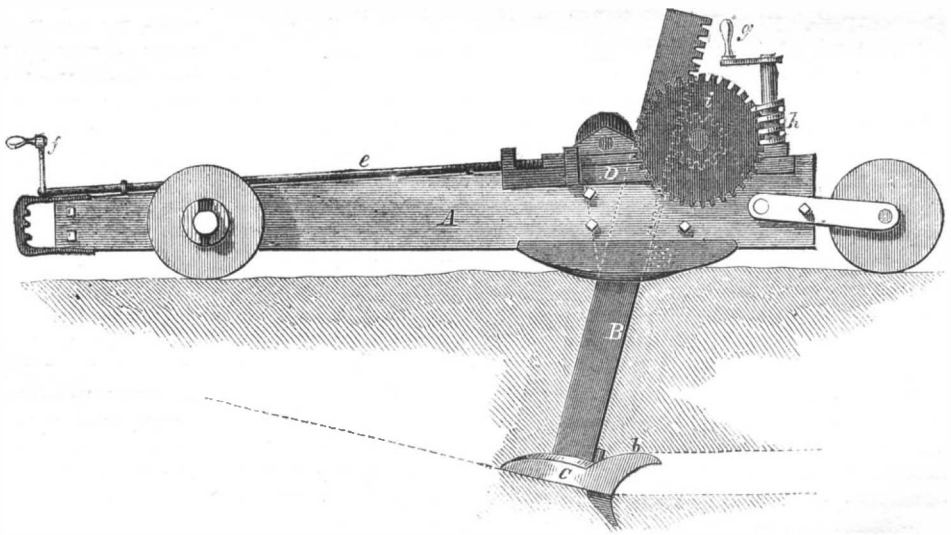
Some of the English papers have commented freely upon the terrible disaster that occurred at Lawrence, Mass., on January 10th; and they all seem to have arrived at the same conclusion as to its cause, namely, the defective nature of the building. They certainly could have arrived at no other opinion by reading any published account whatever of that tragedy. The coroner's jury in the case having censured the chief engineer employed in the construction of the Pemberton Mill (Capt. C. H. Bigelow), he has published a defense of himself in the Boston *Journal*. He lays the blame of the calamity upon the person who furnished the cast iron pillars. He considers that the building was regarded "as a model of excellence in the adaptation of all its parts to the accomplishment of its object," and that it was "overwhelmed in such a total defeat through the most unlooked-for carelessness or dishonesty of a subordinate agent."

The general opinion prevailing among architects, engineers and builders, regarding the cast iron pillars used in the Pemberton Mill, is that, even allowing them to have been inferior castings, the building could not have been properly constructed, when its standing depended upon the breaking of one or even several of those pillars.

It appears strange to us that those who have been chiefly blamed for this disaster, have not been put upon their defense.

IMPROVED MOLE PLOW.

There is no subject attracting more attention at the present time among agriculturists than underground draining. There are thousands of acres of land at present worthless which may by this process be made arable, when they will probably prove to be of inexhaustible fertility There are two principal modes of subterranean draining. One consists in digging trenches and laying pervious pipes of a peculiar kind of pottery through which the water leaches, the gravel being prevented by the nature of the material from accompanying it to choke up the drain. But where the consistence of the soil is such as to keep open the drain without any pipe, a far cheaper process is adopted. This consists in drawing a solid body through the ground at a proper distance beneath the surface, by which means a channel is opened with comparatively great rapidity. The implement for doing this work has received the appropriate name of the mole plow, and a large number of varieties have been patented. On page 140, Vol. I (new series) Scientific American, we noticed one invented by Mr. Hammond, and we now illustrate it, with an improvement which has just been invented.



HAMMOND'S IMPROVED MOLE PLOW.

In the cut, A is the beam to which the team is attached, B the standard, with a knife edge in front, and C the shoe which opens the drain. This shoe has a projection, *d*, with a groove narrowing backward to close the opening made by the standard. Heretofore it has been necessary to dig a hole either to introduce a mole plow into the ground, or to take it out when the work was done, and the object of this invention is to obviate this necessity. The plan adopted is to connect the standard with the beam in such a manner that it may be inclined either forward or backward from the perpendicular which causes the shoe to run either in or out simply by the forward motion of the plow. For this purpose the slot in the beam through which the standard passes is elongated in its upper part, and the plate, D, has a sliding motion back and forth. This motion is effected by means of the screw on the rod, *e*, so that the inclination of the standard is varied by turning the crank, *f*, it being inclined as represented in the cut to remove the plow from the ground, and on the other side of the perpendicular to enter the plow into the earth.

The depth of the ditch is adjusted by raising or lowering the shoe by means of the crank, *g*, which acts through the worm, *h*, and the wheel, *i*, upon a pinion meshing into the rack upon the standard, so that by turning the crank the standard is drawn a greater or less distance through the beam. This adjustment should of course be made before the operation of plowing is commenced.

These inventions were secured by Letters Patent through the Scientific American Patent Agency. For further particulars, address A. Hammond, Jacksonville, Ill.

DEATH OF INVENTORS.

We regret to notice the death of an ingenious inventor and good mechanic, C. A. Schultz, of this city, He recently went to West Covington, Conn., to put up some machinery in a paper mill; and while thus employed, his limbs became entangled in a belt, and he was so seriously injured that his death speedily ensued. An improvement in the steam engine, patented by the deceased, was illustrated and described on page 201, Vol. I, (new series) of the Scientific American.

While about going to press, we were informed that Professor John C. Fr. Saloman had died suddenly of apoplexy, in this city, on the 11th inst, and that very few persons were aware of the fact. His name, as an inventor, has been before the American public for quite a number of years, especially in connection with an engine operated by carbonic gas. He was a native of Prussia, a very good chemist, and quite an enthusiast in all he undertook. At the time of his death he was about 65 years of age.

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NEW YORK, SATURDAY, FEBRUARY 25, 1860.

BREAD-MAKING.

UESTIONS which relate to the stomach must have an audience when they crave one. In peace and war, prosperity and adversity, the subject of bread-making is of vital importance to individuals and communities. The Polytechnic Association—according to their proceedings which are published in another column—have been indulging in a discussion on bread and its adulterations; but so far as it relates to that which is manufactured in our cities for public sale, no new information seems to have been elicited. This is rather strange, as there is so much of it made and sold, not only for daily general use, but for the supply of thousands of our seamen during their voyages. There is a lurking suspicion in the minds of many persons that our bakers do adulterate their bread. Now, if this is so, it ought to be known; and if the members of the Polytechnic Association had brought out any facts, *pro* or *con*, on this point, they would have been of inestimable value. No greater crime, we believe, can be committed against the people than injuriously adulterating "the staff of life." It has been stated, authoritatively, that the bakers in London adulterate their bread with alum, for the purpose of giving dark, inferior flour a white appearance, and some believe that this is done to a greater or less extent in New York. On several occasions we have endeavored to find out, if this were the case, but thus far we have not been able to obtain a single fact in proof of it; we therefore conclude that no such practice prevails among our bakers.

There are several kinds of bread, but these may be divided into three classes—namely, fermented, raised and unfermented bread. There are no less than three species of the leavened bread, however. The first is that which is made from fully fermented dough; the second is obtained from partially fermented dough, called "half-sponge;" and the third that made from dough which is over-fermented, aud allowed to pass slightly into the acetous or sour stage, from which it is brought back to sweetness by fresh flour. The two latter kinds of fermented bread were once made on a large scale in this city, but they soon fell into public disrepute. No kind of fermented bread seems to stand the test of public favor like that made by the old fully fermented process; hence is is believed that it is better adapted for the human palate and for digestion than any other.

Raised bread is that which is made by a gas set free from a salt, such as the carbonate of soda or potash, which swells the dough in baking, and renders the mass light and porous. By the fermenting action, the flour in the dough undergoes a chemical change, and parts with some of its carbon; by the effervescing or raising process, the flour only undergoes a mechanical change—its bulk is simply increased. Every housewife knows how to make effervesced bread by the use of saleratus and cream-of-tartar. The gas which raises the bread by this method is generated by the same substances and by the same means as effervescence is produced in what we call "soda powders." It is a lazy way of making bread, and as it leaves the tartrate of soda and potash in the food, it should not be practiced by any wife or mother who desires to maintain the health of her family. The manufacture of yeast powders is carried on extensively in our country. Such compositions embrace a neutral salt, like saleratus, and some acid in a solid form, such as tartaric. As a substitute for the former solid acids which had been employed for such purposes, Professor Horsford, of Cambridge, Mass., secured a patent on the 22d of April, 1856, for solid phosphoric acid manufactured from calcined bones, by the use of sulphuric acid; and it is considered a good improvement.

Unleavened bread consists of flour simply mixed with clean water, then kneaded into a dough and baked in an oven. It is manufactured in all our seaports on a very large scale in the form of "sea-biscuit." More improvements have been made in the machinery for manufacturing this kind of bread than in any other bread machinery. In the oldest ship bread-baking establishment in this city—Wilson's, No. 73 Fulton-street—improved machinery has lately been applied, by which the flour is mixed, kneaded, and cut into biscuit, ready for the oven, at one continuous operation. Machinery which occupies but a few feet of space will prepare a hundred barrels of flour per day for the ovens.

It has been a most difficult thing to mix dough properly by machinery, because different kinds of flour take more or less water to bring the dough to a proper consistency. The machinery must be adjustable to feed both the water and the flour into the mixer. We have heard practical bakers assert that this never could be done; but what is it that the genius of man cannot now accomplish by the aid of machinery? The thing *is* now done, and the machinery operates perfectly. We believe that there is still a very wide field open for improvements in the manufacture of leavened bread, both chemically and mechanically. An attempt is now being made to manufacture *raised* bread for public sale, by charging the dough in one vessel with carbonic acid gas generated in a separate one, so as to leave no offensive salt in the bread; how it will succeed has yet to be determined.

THE PATENT OFFICE REPORT FOR 1859.

In another column will be found the able report of the Commissioner of Patents, showing the operation of his office for the past year. It exhibits the most gratifying evidence of the continued and increasing progress of the country in this important department, and fully vindicates the claims of the Patent Office to the attention and favor of Congress. We earnestly commend it to the consideration of our readers, not only on account of the important statements, but also of the valuable recommendations which it will be found to embrace.

The receipts of the Office have exceeded the expenditures by more than $35,000. The number of patents issued has been greater by more than twenty per cent than they were in 1858, when they were more than twenty-five per cent greater than for any previous year. In 1853 they amounted to only 958. Since then there has been a constant and rapid increase, until, for the past year, they amount to the immense number of 4,538, yielding a revenue of $245,942 15.

Although the number of patents issued has more than doubled since 1855, the force in the Office has hardly been increased for the past four years. The business of the Office has only been kept from falling greatly in arrear by over-exertion on the part of the Examiners, or by passing too slightly over the cases while under consideration. There is no good reason for permitting the continuance of either of these alternatives. The Commissioner asks for authority to augment the examining *corps*. He has the means of defraying the increased expense, and there should be no hesitation on the part of Congress in granting that permission.

The special attention of Congress is again drawn to the fact that no provision is now made by law for compelling the attendance of witnesses, or for obliging them to give testimony when present. What would be thought of permitting such a state of things in our courts of justice? If, where only five dollars were at stake, the Legislature should refuse to the party interested all power to obtain testimony to secure his just rights, how certain and how severe would be the condemnation of every intelligent and candid mind. But cases before the Patent Office, sometimes involving hundreds of thousands of dollars, are often necessarily decided upon the mere voluntary testimony of witnesses. In some cases, it is true, any error of decision in the Office can, with much additional trouble and expense, be remedied in the courts. But in cases of extensions no such remedy exists. The decision of the Office is final. A worthy applicant for such an extension may be defeated, or an unworthy applicant be sucessful, merely because witnesses, who know facts that would have prevented this injustice, refuse to appear or to give their testimony when present. And yet, with all these facts before them, and constantly called to their special attention from year to year by the annual report of the Commissioner of Patents, Congress pertinaciously refuses to apply the plain and easy remedy. We trust this condition of the law, so disgraceful and so unjust. will soon cease to furnish grounds of complaint to the large number of patentees who are as much entitled to protection and favor as any other class in the community.

In relation to another important recommendation we cannot express our concurrence in terms so unqualified. We question whether the granting of a patent to him who first files his caveat or makes his application, will be attended with all the good consequences anticipated in this report. Upon this point we may express our views more fully hereafter.

DEFECTS OF CALF-SKIN LEATHER—BAD OILS.

A few weeks since (on page 67) we directed attention to some peculiar defects in calf-skin leather, stating that it was subject to a species of dry-rot, similar to that which affects wood, and that the cause of this was not well understood. The fact has been long known to shoemakers and sadlers, but so far as we know, it never had been published before. Our remarks have attracted considerable attention, and we will publish the substance of some letters that have been received on the subject.

Mr. J. B. Williams, of Monongahela City, Pa., says:—"The fact of calf-skin leather becoming affected with dry-rot has been long known to many persons. I think the cause of it is a want of moisture by use, and the want of air, as it is only the leather on boots which are laid aside that seem to be effected with it. We find that boots or shoes which are worn but once in two weeks will remain good for many years."

The following is from Mr. C. L. Robinson, of Waukesha, Wis., on the above subject:—"In the SCIENTIFIC AMERICAN it is stated that the dry-rot in calf-skin boots and shoes makes its first appearance at the edge or near the sole, in the form of a black glossy sweat resembling varnish; and from thence it gradually proceeds until the whole leather becomes rotten. I have noticed that when horse harness has been hanging up for a considerable period of time, that a black gummy suhstance would ooze out from it, especially during hot weather, or in a warm room. A particular case of harness deterioration once came under my notice. A gentleman purchased a new set of harness which was made of good leather, and after using it for a few months he thought it would be improved by applying a good dose of oil. For this purpose he purchased a quantity of what was thought to be tanners' oil, and applied it freely. In a few weeks after this, his harness became very hard and cracked in many places. As I was a harness-maker and knowing something about the tanning business also, he called upon me and asked my opinion as to the cause. Upon examination I found that I could twist the straps of his harness in pieces, and being curious to find out the cause, I made such inquiries as led to the discovery that it was not tanners' oil which had been used, but *resin* oil. I am of opinion that it is the kind of oil or grease used by curriers which—to a certain extent at least—is the cause of early rot in leather. Having been for three years in the tanning business, I have used resin oil, and have seen it used by others for currying, and always with injurious results. Curriers employ this oil for dressing leather because it is so cheap, but no leather should be curried with it. It is poor policy, after such an expense has been involved in tanning calf-skins to make them into good leather, that all this should be nullified by the use of an injurious oil, simply because it sells for one-half the price of well-tried, good oil. Calf-skin leather may be more subject to decay than cow-skin, because the skin in the first place is not so well matured, but I do believe, that more injury is done to leather by the bad oils used by curriers than anything else. All dealers in boots and shoes should treat them lightly to some neatsfoot oil, especially around the uppers, near the soles, once or twice per annum, and expose them as little as possible to dust and the atmosphere."

We have no doubt of the correctness of Mr. Robinson's opinions regarding the deleterious effects of resin oils upon leather. We are not acquainted with a single vegetable or fish oil that is suitable for lubricating leather

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in comparison with tallow or any of the animal oils. We have seen pure olive oil applied to good leather—almost new—and it soon became hard and brittle, and cracked very much like the harness leather described by our correspondent.

Another correspondent, writing to us from Philadelphia, casually alludes to this subject, and points out an advantage secured to him from allowing boots to stand for several months before he uses them for common wear. He says:—"By long practical experience I have learned that a pair of boots which cannot be put on when new without great discomfort to the feet, if left for a year in a dry place, may be readily put on and worn with the greatest comfort. I have frequently seen boots, when laid aside, become green as verdigris with mold. I suppose this was owing to the blacking on them, and as the dry-rot mentioned in the SCIENTIFIC AMERICAN commenced at the seam, I think it must be caused by some application applied to the leather at the seam, when the boots are being sewed. I always dread a newly made pair of boots, and prefer to lay them aside for six months or a year before I wear them, so as to insure comfort from the first moment."

WEEKLY SUMMARY OF INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page:—

TUFTED OR PILED WORK.

The operation to make tufted or piled work by hand, and with the assistance of the worsted pattern alone, is very tedious. Even balls and other smaller articles usually produced in this line of work, if the same have to be made by hand or in the usual manner, take up a great amount of time and labor, as each single thread has to be brought to the proper position for each piece of work. The operation of producing a number of articles from the same pattern at once, and without requiring a fresh adjustment of the thread, has been attempted; but it has hitherto failed because no provision was made to properly separate the various articles after the threads were arranged. This difficulty is completely obviated by the present invention, and all sorts of tufted work can now be produced in any number from the same pattern at one and the same operation. E. Kellerman, of Moosop, Conn., is the patentee.

SHINGLE MACHINE.

The object of this invention is to obtain a machine by which shingles may be sawed from the bolt in proper taper form and the taper varied as may be required, the machine also admitting of "stuff" being sawed with parallel sides such as are used for the heading of casks and other similar purposes. The invention also has for its object an automatic feeding and gigging-back device, so arranged as to operate conjointly with the bolt-adjusting mechanism and form throughout a simple and efficient device. The invention has further for its object the presenting of the bolt to the saw in such a way as to insure an easy and smooth cut, without tearing the fiber or rendering the saw liable to work off from the bolt. The credit of this contrivance is due to David Nicholson, of Lockport, N. Y.

WATER METER.

This invention consists in constructing a mouth-piece or break-water with any suitable number of outlets through which the water is allowed to escape, excepting at one of the outlets, without being measured by the tilt-box, or effecting it in any way, so that where a large quantity of water is used, only a given amount of this will be registered, from which the entire amount can readily be computed. It further consists in enclosing the above-described mechanism within an air-tight casing furnished with a secondary receptacle, and an air-cock by which a regular current or flow of water may be kept up, however varying may be the pressure of the head or source, and by which the mechanism may be kept in good working order. This improvement was designed by E. P. and J. N. Farrar, of this city.

ACOUSTIC APPARATUS.

This invention consists in providing a funnel-shaped receiver within a church pulpit or reading desk or in a table placed in any building or room, and a pipe leading from the throat or bottom thereof either under or above the floor, with one or more branch pipes or tubes leading therefrom to any pew or pews or seat or seats or to any place in the church, building or room, for the purpose of conducting the voice of a minister, lecturer, reader, or speaker or other sound to the ears of any person or persons whose sense of hearing is imperfect or impared. The patentee of this invention is David D. Stelle, of New Brunswick, N. J.

BORING AND MORTISING MACHINE.

This invention relates to an improved machine designed for mortising large timber for framing and consequently wherever an auger is required, in connection with a chisel in order to form the mortising. The object of this invention is to combine the auger and chisel in such a way that either tool may be applied to its work when desired with great facility, and the machine readily secured to the timber. This device has been patented to J. M. Kendall, of South Hardwick, Vt.

SOLDERING-IRON.

This invention consists in constructing the soldering-iron in such a way that the gas introduced into the implement may be burnt at the exterior of the same, so that the implement may be heated more economically and with even greater facility than by the usual charcoal fires. The credit of this contrivance is due to A. Burbank, of Brooklyn, N. Y.

FOREIGN NEWS AND MARKETS.

M. Kuhlman, of Paris, a distinguished chemist, asserts that the use of iron as ship fastenings is one of the chief causes of early decay in the wood. He considers that iron nails and spikes act the part of carriers of oxygen into the timber to promote slow combustion.

Screw steamships, of the same size as paddle-wheel vessels, have generally been built with engines of much less power. It has long been held by many engineers that, if such steamers were furnished with engines of a proportional power, they would surpass paddle-wheels in speed. The question is about to have its proper solution. The Cunard company has lately purchased the *Australian*, which is a Clyde-built screw steamer of full power, and she is to take her place as one of their line. She is built of iron, is 331 feet long, 42 feet wide, and has two 90-inch cylinder engines.

The steel wire mills of Sheffield are very busy at present, and the American orders on hand are somewhat extensive. The most of the wire ordered is for making wire ropes; still there are also quite a number of orders for crinoline.

The iron manufactures in England, in all their branches, are now in a very prosperous condition; and so are all the cotton interests. The whole country appears to have completely recovered from the financial panic of 1857, and trade never was better.

NEW YORK MARKETS.

BEESWAX—American yellow, 36c. a 37c. per lb.

CANDLES.—Sperm, city, 38c. a 40c. per lb.; sperm, patent, 50c.; wax, paraffine, 50c.; adamantine, city, 18c. a 20c.; stearic, 27c. a 28c.

COAL.—Anthracite, $4.50 a $5; Liverpool orrel, per chaldron, $12; cannel, $13.

COPPER.—Refined ingots, 24c. per lb.; sheathing, 27c.; yellow metal, 20c.

CORDAGE.—Manilla, American made, 8c. a 8¼c. per lb.; Rope, Russia hemp, 12c.

COTTON.—Ordinary, 9c. a 9¼c.; good ordinary, 9⅞c. a 10⅜c.; middling, 11⅜c. a 11⅞c.; good middling, 12c. a 12¾c.; middling fair, 12½c. a 13⅛c.

DOMESTIC GOODS.—Shirtings, brown, 30-inch, per yard, 6c. a 7¼c.; shirtings, bleached, 26 a 32-inch, per yard, 6c. a 8c.; shirtings, bleached, 30 a 34-inch, per yard, 7c. a 8½c.; sheetings, brown, 36 a 37-inch, per yard, 5½c. a 8¾c.; sheetings, bleached, 36-inch, per yard, 7¾c. a 15c.; calicoes, 6c. a 11c.; drillings, bleached, 30-inch, per yard, 8¼c. a 10c.; cloths, all wool, $1.50 a $2.50; cloths, cotton warp, 85c. a $1.37; cassimeres, 85c. a $1.37½; satinets, 30c. a 60c.; flannels, 15c. a 30c.; Canton flannels, brown, 8½c. a 13c.

DYEWOODS.—Barwood, per tun, $18 a $20; Camwood, $130; Fustic, Cuba, $35 a $36; Fustic, Tampico, $25; Fustic, Savanilla, $20 a $22; Fustic, Maracaibo, $18.50 a $19; Logwood, Laguana, $22 a $23; Logwood, Tabasco, $21; Logwood, St. Domingo, $14.50 a $15; Logwood, Honduras, $16 a $17; Logwood, Jamaica, $13.50 a $14; Lima wood, $65 a $75; Sapan wood $45.

FLOUR.—State, superfine brands, $5 a $5. State extra brands, $5.20 a $5.40; Michigan fancy bands, $2.25 a $5.35; Ohio, common brands, $5.20 a $5.30; Ohio, fancy brands, $5.35 a $5.40; Ohio, fair extra, $5.75 a $5.95; Ohio, good and choice extra brands, $6 a $6.75; Michigan, Indiana, Wisconsin, &c., $5.25 a $5.50; Genesee, fancy brands, $5.50 a $5.60; Genesee, extra brands, $5.70 a $7.25; Missouri, $5.50 a $7.50; Canada, $5.45 a$6.75; Rye flour, fine, $3.75 a $3.90; corn meal, $3.80 a $4.20.

HEMP.—American undressed, $120 a $150; dressed, from $160 a $200. Jute, $95 a $97.50. Italian, $275. Russian clean, $190 a $200 per tun. Manilla, 6½c. per lb. Sisal, 5½c.

INDIA-RUBBER.—Para, fine, 55c. a 60c. per lb.; East India, 52c.

INDIGO.—Bengal, $1 a $1.55 per lb.; Madras, 70c. a 95c.; Manilla 60 c. a $1.10; Guatemala, $1 a $1.25.

IRON.—Pig, Scotch, per tun, $25; bar, Swedes, ordinary sizes, $85 a $86; bar, English, common, $42.50 a $43.50; refined, $52 a $54; sheet, Russia, 1st quality, per lb., 11½c. a 11¾c.; sheet, English, single, double and treble 3½c. a 3⅝c.; anthracite, pig, $24 per tun.

IVORY—Per lb., $1.[illegible]30.

LATHS.—Eastern, per M., $1.75 a $2.

LEAD.—Galena, $5.7[illegible] per 100 lbs.; German and English refined, $5.60 a $5.65; bar, sheet and pipe, 6¾c. a 7c. per lb.

LEATHER.—Oak slaughter, light, 29c. a 31c. per lb.; Oak, medium 30c. a 32c.; Oak, heavy, 28c. a 31c.; Oak, Ohio 29c. a 30c.; Hemlock, heavy, California, 20c. a 21½c.; Hemlock, buff, 15c. a 18c.; Cordovan, 50c. a 60c.; Morocco, per dozen, $18 a $20; Patent enameled, 16c. a 17c. per foot; light Sheep, morocco finish, $7.50 a $8.50 per dozen; Calf-skins, oak, 55c. a 60c. per lb.; Hemlock, 56c. a 60c.; Belting, oak, 32c. a 34c.; Hemlock, 28c. a 31c.

LIME.—Rockland, 75c. per bbl.

LUMBER.—Timber, white pine, per M feet, $17.75; yellow pine, $35 a $36; oak, $18 a $28; Eastern pine and spruce, $14 a $15; White Pine, clear, $35 a $40; White Pine, select, $25 a $30; White Pine, box, $14 a $18; White Pine, flooring, 1¼ inch dressed, tongued and grooved, $24.50 a $25; Yellow Pine, flooring, 1¼ inch, dressed, tongued and grooved, $29 a $32; Black Walnut, good, $45; Black Walnut, 2d quality, $30; Cherry, good, $45; White Wood, chair plank, $42; White Wood, 1 inch, $23 a $25; Spruce Flooring, 1¼ inch, dressed, tongued and grooved, each, 22c. a 24c.; Spruce Boards, 15c. a 17c.; Hemlock Boards, 12½c. a 14c.; Hemlock wall strips, 10c. a 11c.; Shingles, cedar, per M. $28 a $35; Shingles, cypress, $12 a $25; Staves, W. O. pipe, light, $55 a $58; Staves, white oak, pipe, heavy, $75 a $80; Staves, white oak, pipe, culls, $30 a $35; Staves, do. hhd., heavy, $70; Staves, do. bbl. light, $30 a $35; Staves, do. bbl. culls, $20; Mahogany—St. Domingo, fine crotches, per foot, 35c. a 45c.; St. Domingo, ordinary do., 20c. a 25c.; Honduras, fine, 12½c. a 15c.; Mexican, 13c. a 15c.

NAILS.—Cut, 3¼c. a 3⅜c. per lb.; American clinch, 5c. a 5⅛c.; American horse-shoe, 14½c

OILS.—Olive, Marseilles, baskets and boxes, $3.45 a $3.50; Olive, in casks, per gallon, $1.12 a $1.25; Palm, per pound, 9c. a 9¼c.; Linseed, city made, 57c. a 58c. per gallon; linseed, English, 57c. a 58c.; whale, fair to prime, 48c. a 52c.; whale, bleached 59c. a 60c.; sperm crude, $1.40 a $1.43; sperm, unbleached winter, $1.47; lard oil No. 1, winter, 90c. a $1; red oil, city distilled, 57c.; Wadsworth's, refined rosin, 25c. a 35c.; boiled oil for painting, 25c. a 35c.; tanner's improved and extra, 30c. a 40c.; camphene, 45c. a 47c.; fluid, 50c.

PAINTS.—Litharge, American, 7c. per lb.; lead, red, American, 7c.; lead, white, American, pure, in oil, 8c.; lead, white, American, pure, dry, 7¼c.; zinc, white, American, dry, No. 1, 5c.; zinc, white, French, dry, 7¼c.; zinc, white, French, in oil, 9½c.; ochre, ground in oil, 4c a 6c.; Spanish brown, ground in oil, 4c.; Paris white, American, 75c. a 90c. per 100 lbs.; vermillion, Chinese, $1.12½ a $1.22; Venetian red, N. C., $1.75 a $2.25 per cwt.; chalk, $4 per tun.

PLASTER-OF-PARIS.—Blue Nova Scotia, $2.75 per tun; white, $3.50; calcined, $1.20 per bbl.

RESIN.—Turpentine, soft, N. C., per 280 lbs., $3.50 a $3.56; Wilmington, &c., $3.50 a $3.56; common, per 310 lbs., $1.62 a $1.65; strained and No. 2, $1.65 a $2.00; No. 1, per 280 lbs. $2 a $2.87; white, $3 a $4; pale, $4.50 a $5.50.

SALTPETER.—Refined, 12c. per lb.

SOAP.—Brown, per pound, 5c. a 8c.; Castile, 9c. a 9½c.; Olive, 7c. a 7½c.

SPELTER plates, 5c. a 5¾c. per lb.

STEEL.—English cast, 14c. a 16c. per lb.; German, 7c. a 10c.; American spring, 5c. a 5½c.; American blister, 4½c. a 5¼c.

SUGAR.—New Orleans, 7c. a 8¾c. per lb.; Porto Rico, 7c. a 8¾c.; Havana, brown and yellow, 7c. a 8¾c.; Havana, white, 9c. a 9¾c.; Brazil, white, 8c. a 8½c.; Brazil, brown, 7½c. a 7⅞c.; Stuart's granulated, 10c.

SUMAC.—Sicily, $70 a $80 per tun.

TALLOW.—American prime, 10¾c. a 10¾c. per lb.

TIN.—Banca, 32c.; Straits, 30c.; plates, $6.50 a $9.25½, per box.

WOOL.—American, Saxony fleece, per lb., 55c. a 60c.; American full blood merino, 48c. a 52c.; extra, pulled, 45c. a 50c.; superfine, pulled, 39c. a 43c.; California, fine, unwashed, 24c. a 32c.; California, common, unwashed, 10c. a 18c.; Mexican, unwashed, 11c. a 14c.

ZINC.—Sheets, 7¼c. a 7½c. per lb.

The foregoing rates indicate the state of the New York markets up to February 16th.

Our markets have been very quiet during the past and present month, and there was scarcely any change in prices during the week just passed. The Spring business is growing apace from day to day without any fluctuation in prices. The western States do not seem to have recovered from their depressed commercial condition yet, and, as a consequence, their merchants are cautious in buying. The southern trade is becoming quite brisk. Manufacturers have little or no stock of made goods on hand; large buyers, on this account, are compelled to order what they want ahead. Winter silks have declined in price since the first of January.

The imports entered at the Custom House of New York, during the week ending Feb. 11th, amounted in value to $1,639,618; and of this the two highest amounts were for tea and coffee, $515,803 for the former and $125,458 for the latter.

Our export trade of American manufactures is much greater than many persons suppose. Since January 1st, it has amounted to 11,492 packages, valued at $695,307.

An immense sale of American fleece and pulled wool took place on the 16th inst., by Messrs. Dike & Brothers, of this city. The catalogue comprised half a million of pounds, of all shades and qualities. The sale was well attended, and prices ruled at about the regular quotations. The prices were considered good, and this is a favorable sign in regard to the prosperity of our woolen manufactures. Ohio, Pennsylvania and New York fleeces brought the highest prices—54 cents.

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THE RISE AND PROGRESS OF INVENTIONS.

ADVICE TO INVENTORS.

During the period of Fourteen Years which has elapsed since the business of procuring patents for inventors was commenced by MUNN & Co., in connection with the publication of this paper, the number of applications for patents in this country and abroad has yearly increased until the number of patents issued at the United States Patent Office last year (1859) amounted to 4,538; while the number granted in the year 1845—fourteen years ago—numbered 502—only about one-third as many as were granted to our own clients last year; there being patented, through the Scientific American Patent Agency, 1,440 during the year 1859. The increasing activity among inventors has largely augmented the number of agencies for transactiag such business; and at this time there is scarcely a town of 4,000 inhabitants, but has its patent agent, patent lawyer, patent solicitor, or patent attorney, all of which terms are used to convey the same idea—viz., that their services are offered to the inventor or patentee for a pecuniary consideration.

In this profession, the publishers of this paper have become identified with the universal brotherhood of Inventors and Patentees at home and abroad, at the North and the South; and with the increased activity of these men of genius we have kept apace up to this time, when we find ourselves transacting a larger business in this profession than any other firm in the world. Year after year, we have increased our facilities for transacting patent business, by gathering around us a large corps of the most eminent engineers, draughtsmen and specification writers that can be procured. Among these gentlemen are those who have been connected with the United States and Foreign Patent Offices. The latest engagement we have made is the association with us of Hon. Charles Mason, formerly COMMISSIONER OF PATENTS, and favorably known to the Inventor as their friend and advocate. The memory of his acts while holding this high position will be cherished by many an honest inventor with gratitude as long as he lives.

The arrangement made with Judge MASON renders our facilities for prosecuting all kinds of patent business complete, however ample they were before; and without being accused of egotism, we may safely assert that no concern has the combined talent and facilities that we possess for preparing carefully and correctly applications for patents, and attending to all business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements. &c.

FREE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable are advised to make a sketch or model of their invention, and submit to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons, under the direction of a gentleman who has spent a lifetime about the Patent Office. Over 1,500 of these examinations were made last year through this office, and as a measure of prudence and economy, we usually advise inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared on reasonable terms, by sending a sketch and description of the invention. The government fee for a caveat is $20. A pamphlet of advice regarding applications for patents and caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition is composed for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fee, by express. The express charges should be prepaid. Small models, from a distance, can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park-row, New York.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, enclosing the official letters, &c.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery Lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that three-fourths of all the European patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of the different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our branch offices.

INTERFERENCES.

We offer our services to examine witnesses in cases of interference, to prepare arguments, and appear before the Commissioner of Patents, or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "Hints to Inventors." Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Many persons have been ruined from adopting the "penny-wise and pound-foolish" maxim, when an investment of a few dollars, to have been informed of their rights, would have saved them much anxiety and money. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. Judge MASON assists in all examinations of this kind.

For further particulars, address MUNN & CO., No. 37 Park-row, New York.

EXTENSIONS OF PATENTS.

Valuable patents are annually expiring, which might be extended, and bring fortunes to the households of many a poor inventor or his family. During the past fourteen years, we have had much experience in procuring the extension of patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we never lost but two cases—and those were unsuccessful from causes entirely beyond our control.

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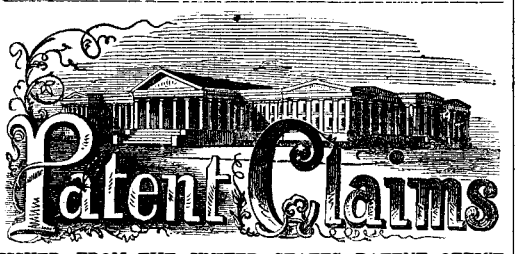

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING FEBRUARY 14, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

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26,091.—L. Acree, of Taliaferro county, Ga., for an Improvement in Cotton Seed Planters:

I claim the combination of the hopper, H, shaking box, G, and revolving feed roller, F, arranged, combined and operating together in the manner and for the purpose stated.

I also claim hinging the coverers to the main frame through the slotted hinges, v, so that said coverers may follow the ground, without being influenced by the frame, as set forth.

27,092.—Geo. C. Aiken, of Nashua, N. H., for an Improvement in Cultivator Teeth:

I claim the combination and arrangement of the fixed plate, B, vertical coulter, A, flanges or moldboards, C C, and cutters, D D, substantially as set forth.

27,093.—Wm. L. Aldrich, of Atlanta, Ga., for an Improved Press for Attaching Leathers to Billiard Cues:

I claim the combination and arrangement of the thumb screws, A and B, frame, D, lever, E, and socket, C, substantially as and for the purpose specified.

27,094—Ethan Allen, of Worcester, Mass., for an Improvement in Machines for Making Percussion Cartridge Cases:

I claim, first, The trimming mechanism composed of the sliding loose mandrel, C, the revolving chuck mandrel, S, and automatic tool, when constructed and operating substantially as described.

Second, I claim striking or forming the hollow rim at one stroke or operation, as above set forth, and described.

27,095.—Henrietta G. Batty, of Springfield, Mass., for an Improved Spring Egg Cup:

I claim the construction and arrangement of the elastic springs, B B, attached to the metallic standard, A A, the movable pin or slide C C, passing through the standard, A A, in the manner and for the purposes substantially as set forth.

27,096.—Joseph Berry, of New York City, for an Improved Cut Nail Machine:

I claim, first, The arrangement of the cutters, a, upon the face of the cutter head, F, near the center thereof, substantially as and for the purpose shown and described.

Second, The arrangement of the vibrating anvil, J, cam-shaped groove, G, anvil shaft, K, arm, P, rod, M, lever, Q, as and for the purpose shown and described.

[This invention consists in the combination of a rotating cutter-head, provided with a series of cutters set obliquely in reverse directions alternately, and an anvil and die oscillating on an axis perpendicular to the axis of the rotating cutter-head,]

27,097.—Harris Boardman, of Lancaster, Pa., for an Improvement in Metallic Carriage Hubs:

I claim the arrangement and combination of the clamp plates, E, and wedge, D, as attached to the chambered metallic hub, substantially as described and for the purposes set forth.

27,098.—Edmund Brickett, of Minot, Maine, for Improved Braces for Harness Breeching and Breast-plates:

I claim the application to harnesses of metallic breeching and breast plate braces, with the rings and shanks, connecting with the braces, as described, using for that purpose the aforesaid metallic substance, or any other metallic substance suitable for that purpose.

27,099.—R. H. Brooks, of Greenville, Ga., for an Improvement in Plows:

I claim the arrangement of braces, D D C, holes, H O, V I, screw bolt, T, pieces, P P, opening, B, beam, A, standard, B, heel screw, W, notch, X, and opening, g, constructed as described for the purposes set forth.

27,100.—R. F. Brower, of New York City, for an Improved Rotary Steam Engine:

I claim the methods or devices substantially as described, which serve as steady and regular points of counter-resistance to the direct action of steam, when employed in a series of diverging cylinders, which revolve eccentrically to the center of motion of the driving-wheel, without the aid of any other separate movable parts, such as valves or springs.

27,101.—T. W. Brown, of Boston, Mass., for an Improved Twine-holder:

I claim the improved twine-holder as made substantially in manner and so as to operate as described.

27,102.—Joel Bryant, of Brooklyn, N. Y., for an Improvement in Grinding Mills:

I claim, first, In the construction of portable grinding mills, the cog wheel, C 1 C 2 and C 3, when constructed, set, and operating in connection with each other, and the cylinders, A and B, of the said mills, substantially as described and for the purposes set forth.

Second, And in connection with the above, I claim the making, setting and gearing of the body, M, of portable grinding mills, so as that the said mills (Fig. 1) may be set to run and grind at any desirable plane of the horizon, either vertical or horizontal, or oblique, substantially as described and for the purposes set forth.

27,103.—R. B. Burchell, of Brooklyn, N. Y., for Improved Musquito Nets and Shades for Windows:

I claim attaching a window shade or musquito net, C, to a roller, B, and rods, a' a', which are fitted in tubes, c c; said shade or net having its lower end attached to a bar, D, provided at its ends with double guides or gibs, E, which are fitted on rods, a' a', the whole being applied to the window frame, and arranged to operate as and for the purpose set forth.

27,104.—John F. Burgin and Augustus Koch, of Williamsport, Pa., for an Improved Hydraulic Engine:

We claim the arrangement for converting the rectilinear alternate motion into a rotating one, by means of water or any other non-elastic fluid whose force, derived from an artificial pressure, causes a wheel to turn around its axis, as described.

27,105.—Samuel Buser and J. H. Buser, of Warner, Ill., for an Improvement in Harvesters:

We claim the combination of the frames, A E, hinged at c c, with the elevating devices, viz., the rack bar, I, shaft, o, chain, M n, and sliding caster wheel, O, arranged to operate in the manner and for the purpose shown and described.

[This invention relates to a novel cutting device, and an improved arrangement of means for regulating the position of the same to determine the hight of the cut, and to facilitate the raising and lowering of the cutting device, so that it may pass over any obstructions that may be in its path.]

27,106.—Abner Carey, of Rome, Ga., for an Improvement in Cultivators:

I claim the described arrangement of the plows, H, beams, G and perforated rails, D, the whole being constructed and combined in the manner and for the purposes set forth.

27,107.—Abner Carey, of Rome, Ga., for an Improvement in Cotton Seed Planters:

I claim the combination the horizontal conical hopper, E, and duplex, saw-shaped feeder, K, constructed, arranged and operating substantially as and for the purposes set forth.

27,108.—J. B. Charles, of Ashland, Ohio, for an Improvement in Fan-blowers:

I claim giving a concave or recessed shape to the faces of the fanning wings, f, at the same time that the oblique eduction apertures, i i, are formed opposite said wings, in the sides of the fanning chamber, substantially in the manner and for the purpose set forth.

27,109.—E. B. Clark, of Tallahassee, Fla., for an Improvement in Plows:

I claim the arrangement of the longitudinal bar, D, shovel, E, double brace, C', double brace, C, bolt, c, projection, d, beam, A, and handles, B, as and for the purpose set forth and described.

[This invention consists in a combination of diagonal crossbars with a longitudinal brace; the whole being bolted together and secured rigidly to a plow beam in such a manner as to form a braced standard for the shovel, admitting of its being readily attached and detached.]

27,110.—Henry E. Clinton, of Woodbridge, Conn., for an Improvement in Carriage Thill Attachments:

I claim the application of the spring key, B, substantially and for the purposes as is herein set forth.

27,111.—John W. Colemant of Medway, Mass., for an Improvement in Stoves:

I claim the arrangement of the sliding doors, B and B, with the stove, A, and oven, G, so that the heat from around the cylinder of the stove may be confined within or entirely cut off from the oven, by closing or opening said doors in the front or back of the stove; the whole being constructed and operated substantially in the manner and for the purpose set forth.

27,112.—Thomas Daniels, of Toledo, Ohio, for an Improvement in Stop-cocks:

I claim the arrangement of the several sirup and water tubes provided with valves, as shown, in combination with the common discharge chamber, L, and tube, C, substantially as set forth for the purposes described.

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27,113.—John Davis and Sturgis Chaddock, of Boston, Mass., for an Improvement in Gas Retorts:

We claim, first, The movable flues, B, constructed and applied as described, in connection with the door, C, and its flue or projection, D, and the collar of the retort, substantially in manner and for the purpose as described.

Second, We claim the peculiar construction of the door, C, with its projection or flue, D, in connection with the collar of the retort and the movable flues, B; the whole being applied to the interior of the retort, and operating together substantially in manner and for the purpose as set forth.

Third, We claim the combination of the safety valve with the flue, D, of the door, C, in manner and for the purpose as specified.

27,114.—Louis De Masure, of New York City, for an Improvement in Safety Studs:

I claim, first, The movable plate, h, which, after the stud is placed within the button hole, is capable of advancing towards or receding from the front or top plate, c, guided by the circular rods, f f, by means of a turning or revolving plate, C.

Second, I claim the plate, g, provided with circular rods, f f, and fitting loosely upon the screw stem, e.

Third, I claim securing the pointed pins, i i, into the plate, g (a plate separate from the front or top plate, c), so as to cause them to enter the cloth in the operation of securing the stud to the same.

27,115.—B. Wells Dunklee, of Boston, Mass., for an Improvement in Cooking Utensils:

I claim the cover as constructed with an outer casing, A, and with an inner casing, B, attached thereto, substantially and for the purpose as specified.

27,116.—Leopold Eidlitz, or New York City, for an Improvement in Photographic Bank Notes:

I claim the use of the photographic process, as a substitute, either wholly or in part, for engraving or printing bank notes, or other instruments requiring security against counterfeiting, in combination with the employment of paper bearing either a pressed mark or a water-mark, produced as described, or by any similar means.

26,117.—Josiah S. Elliott, of West Needham, Mass., for an Improvement in Brick Presses:

I claim, first, The carrier, O, operated substantially as described.

Second, I claim clutching the cam, D, to the wheel, G, in the manner substantially as shown, for the purpose specified.

27,118.—E. P. Farrar, of New York City, and J. N. Farrar, of Pepperell, Mass., for an Improvement in Water Meters:

We claim, first, In combination with a mouthpiece constructed as described, the arrangement of any suitable number of radial and inclined tubes applied to said tubes in such a way that each will eject its equal share of water; this we claim in combination with the box, H, deflecting plates, r, one over each tube and secondary box, M, all arranged substantially in the manner and for the purposes set forth.

Second, We claim, in combination with the air-tight casing and tilting or measuring vessel, or its equivalent, the secondary receptacle, M, communicating with the top of case, N, and arranged in connection with the inlet pipe, G, substantially in the manner and for the purposes described.

27,119.—Lucius N. Fay and Wm. Mason, of Warren, Mass., for an Improvement in Blind Operators:

We claim, first, The combination of the screw shaft, b, rack, c, pinion, g, and slotted arm, h, applied to the window casing and blind, substantially as and for the purpose set forth.

Second, The shaft, k, having the spiral spring, l, placed on it, and provided with the bent arm, O, and projection, j, the latter being fitted in the slotted arm, h, in connection with the hooked plate, q, the above parts being used with or without the slide bolt, t, substantially as and for the purpose specified.

[This invention relates to an improvement in the devices hitherto employed for opening and closing window blinds at the inner side, or within the apartment in the side of which the window is placed, without raising the window. The object of the invention is to obtain a more compact device than the ones formerly used for the purpose, so that the mechanism may be applied without materially changing or altering the proper proportion or relation of the parts of the window and its casing. The invention further relates to an improved lock attachment in connection with the blind-operating mechanism above specified, the parts being so arranged that the blind will be locked automatically as it closes.]

27,120.—Peter Flickinger, of Hanover, Pa., for an Improvement in Harvesters:

I claim the tongue, T, constructed with the shoulders, c c, and ball-washer, B, on the rear extremity, in combination with the front and rear cross beams of the frame, having the openings, O, in the one, and the slot, S, in the other, substantially as and for the purpose set forth.

27,121.—James M. Freeman, of Belleville, N. Y., for an Improvement in Carriage Tops:

I claim the arm, A, with its button, D, or its equivalent, which will allow the carriage top to be raised and lowered without buttoning and unbuttoning or injuring the curtains to the top, and allow at the same time the top to be extended forward so as more completely to protect the person from storms and inclement weather.

27,122.—Aaron W. Geaheart, of Beallsville, Ohio, for an Improvement in Beehives:

I claim the arrangement of the strips, a b and c, so as to produce a galvanic current between the hive and its platform, or other support, in the manner and for the purpose specified.

27,123.—W. G. Grecley, of Hingham, Mass., for an Improved Machine for Cutting-out the Uppers and Soles of Boots and Shoes:

I claim the reversible block or cutter-holder, n, attached to an adjustable handle, F, and used in connection with a movable bed-piece, B, operated by the toggles, C C, and treadle, E, or their equivalents, substantially as and for the purpose set forth.

[This invention consists in the employment or use of a reversible block or cutter-holder, in connection with a movable bed-piece fitted within a suitable framing, whereby the uppers and soles of boots and shoes may be cut from the leather or stock very expeditiously and with great facility.]

27,124.—Sheldon Guthrie, of New Orleans, La., for an Improvement in Lamps:

I claim this new and improved arrangement of tubes or burners, and wicks for burning all kinds of common oil, grease, fluids, &c., for the purpose of producing artificial light, as substantially set forth and described, the same being applicable to tubes of any size in proportion to the degree of light desired.

27,125.—J. O. Harris and W. F. Slewder, of Ottawa, Ill., for an Improvement in Cultivators:

We claim, in combination with a V-shaped adjustable and reversible frame, the adjustable and hinged plow stocks, B, when constructed and arranged substantially in the manner and for the purpose described.

27,126.—Frank J. Henkel, of New York City, for an Improved Secretary Table:

I claim, first, The arrangement of the hinged flaps, C, in combination with the frame, A, of a table, and with the swivel head, D, or its equivalent, constructed and operating substantially as and for the purpose described.

Second, The combination of the hinged table-top, E, looking glass, G, and writing desk, H, with the frame, A, and flaps, C, substantially in the manner and for the purpose specified.

[This invention consists in arranging on the sides of a table hinged flaps, which are so connected to a common swivel head that they allow of being turned to a vertical or to a horizontal position. The object of these flaps, when the same are in a vertical position, is to conceal the real nature of the table, which may be constructed into a writing desk and with a looking glass and with a number of more or less secret drawers, so as to serve as a secretary and also as a dressing table. When the flaps are in a horizontal position, they are very convenient when the table is used whilst playing &c.]

27,127.—Gustav Heydrich, of Philadelphia, Pa., for an Improved Fire-escape:

I claim the described apparatus for saving lives and property in cases of fire, when the same is permanently attached to the cornice of the building, and constructed and operating substantially in the manner and for the purpose set forth.

27,128.—Birdsill Holly, of Lockport, N. Y., for an Improvement in Pumps:

I claim connecting the valve, H, to the piston, D, by means of the rod, g, or its equivalent, hollow piston stem, E, and regulating nut, a, arranged and operating substantially in the manner and for the purpose shown and described.

27,129.—Wm. H. Howard, of Philadelphia, Pa., for an Improved Machine for Serrating the Edge of a Screw Thread on Rollers:

I claim serrating the surfaces of metal bars or roller by means of a screw-cutting die, J, and a milling roller, K, arranged in respect to and operating simultaneously on the said bar, substantially as set forth.

27,130.—Charles S. Irwin, of Madison, Ind., for an Improvement in the Manufacture of Starch:

First, In the manufacture of starch from maize or Indian corn, I claim my improved method of treating the corn preparatory to its being crushed and ground, by steeping the same in water heated an average temperature of 160° Fah., or to any other temperature, ranging between 145° and 180° Fah., said water being, as usual, changed from time to time so as to maintain the requisite temperature, and to remove the water acidulated by previous fermentation of the corn, substantially in the manner and for the purposes set forth.

Second, In the manufacture of starch from maize or Indian corn by steeping the whole and uncrushed corn in water heated to a temperature of from 70° to 180° Fah., and by then grinding it with water heated to a temperature of from 70° to 140° Fah., I claim the method described of effecting the separation of the starch from the gluten in a more perfect manner than this has been done heretofore, by maintaining the temperature of the starch water, while in the runs, at or heating the same previous or during the separation of the starch from the gluten to an average temperature of 60° Fah., or to any other temperature ranging between 55° to 70° Fah., substantially in the manner and for the purposes set forth.

27,131.—Geo. W. Jennings, of Boston, Mass., for an Improved Laundry and Tailor's Press:

I claim the combination and arrangement of the movable table or arm and the levers or toggle joint for operating the same, to bring the work up to the movable or revolving iron, when constructed and operating in the manner and for the purposes as set forth and described.

27,132.—Geo. Juengst, of New York City, for an Improvement in Sewing Machines:

I claim, first, The combination of the rotating shafts, F K, one of them carrying a revolving arm, J, and the other two revolving cranks, G H, when the said shafts, arm and cranks are arranged and operated as shown and described.

Second, The shuttle-driver with its jointed horn, j, ear, r, and spring, p, applied and operating in combination with the guide, m n' o, on one side of the shuttle race, and operating substantially as described.

[This invention consists in a novel method of driving the needle by a crank motion, which causes its movement to be accelerated and retarded at different stages in the manner best adopted for the formation of the loops in its thread and for the production of perfect sewing. It also consists in a certain construction of the shuttle-driver, and in certain contrivances, in combination with which it operates, whereby, although the necessary openings are permitted between the horns of the driver and the shuttle at the times of the entry of the shuttle into the loops of the needle thread and the passage of the loops over the heel of the shuttle, the horns are both brought close to the shuttle at the times of the change of direction of its movement, and hence the unpleasant ratting noise so common to shuttle sewing machines is prevented.]

27,133.—Emil Kellerman, of Moosop, Conn., for an Improvement in the Manufacture of Tufted Work:

I claim the employment of a series of metallic plates, A, when arranged, combined and operating in the production of tufted work, as shown and described.

27,134.—J. M. Kendall, of South Hardwick, Vt., for an Improved Feed Motion for Boring or Mortising Machines:

I claim the pawl, Q, attached to the frame, A, engaging with the rack, e, and operated by the cross-bar, f, of the sash or gate, I, for the purpose specified.

27,135.—Charles Kinzler and Wilhelm Rosebuck, of New York City, for an Improved Sugar-cutter:

We claim the arrangement of two plates provided with knives forming square openings, and capable of moving towards and from each other, for the purpose of cutting or cracking the slabs of sugar into regular morsels, in combination with fixed frames provided with points which enter the openings in said plates when the latter are receding for the purpose of pushing the morsels or pieces which may adhere to the knives out of the holes, and operating together in the manner and for the purpose substantially as described and specified.

27,136.—Thos. Lovelidge, of Philadelphia, Pa., for an Improvement in Looms:

I claim the escapement or pallet wheel, H, on the end of the warp beam, the weighted pallet lever, I, the arm, J, and catch, f, in combination with the rollers, n and n', and the weighted bar, m, or its equivalents, the whole of the parts being arranged for joint action, as and for the purpose set forth,

27,137.—Daniel Lovejoy, of Lowell, Mass., for an Improvement in Spring Skates:

I claim the combination of the runner, C, the joints, D and D', at the heel and toe thereof, and the springs, E and E', which connect said joints and runner with the stock of the skate, for the purpose and substantially as described.

27,138.—John W. Mackenzie, of San Francisco, Cal., for an Improved Apparatus for Freeing Ship's Holds from Water:

I claim the arrangement of compartments, a a1 a2 a3 a4 a5, and valves, f f' &c., in relation to and in communication with a ship's hold, A, and discharge passages, c, constructed as and for the purposes described.

[This invention consists in constructing the ship with a series of valved chambers at her stern, bow or sides, and in communication with a ship's hold and certain discharge passages, so that when the ship pitches fore-and-aft or rolls heavily, any water which flows into her hold, by reason of leaks being sprung, shall be automatically raised therefrom and discharged into the sea, and thus loss of life, ship and cargo prevented. We regard this as an almost invaluable invention if it will operate well in practice.]

27,139.—J. P. Manton and H. A. Billings, of Providence, R. I., for an Improvement in Hanging Rudders:

We claim the combination with the rudder head, C, and hull, A, of the plates, D E, when the latter are flanged, as shown, to prevent surging, and provided with grooves, f g, with friction balls, h, interposed, as and for the purposes set forth and described.

[The object of this invention is to hang the rudder in such a manner that it will work with but little friction, and still be properly supported and firmly secured to the vessel.]

27,140.—H. Maranville, of Clinton, Ohio, for an Improvement in Coin Detectors:

I claim the arrangement of the plate, A, with diameter scale, c, and incisions, d d', and with knife edges, 6, in combination with the slide, B, marked on one side for gold, and on the other side for silver coins, as described, and operating in the manner and for the purpose specified.

[This is a very neat and compact device, calculated to enable every person to judge at a glance about the value and genuineness of any coin whatever.]

27,141.—Charles McCammon, of Albany, N. Y., for an Improvement in Constructing Bars of Cast or Wrought Iron:

I claim the combining of wrought iron with cast iron in the formation of bars, by the process and for the purposes set forth and described in the specification.

27,142.—Isaac M. Milbank, of Greenfield Hill, Conn., for an Improvement in the Apparatus for Manufacturing Oxyd of Zinc:

I claim the combination and arrangement of the furnace, A, with metal top, accessible openings, d and e e, and the flues, b b, in connection with the perforated pipes, c c, the shoot, f, the receptacle, j, the duct, B B, with its reticulated surface, K, the collecting or saving apparatus with the apartment, c, to be managed and used as described in the specifications.

27,143.—Wm. Mosher, Isaac H. Mosher and John J. Harris, of Green, N. Y., for an Improvement in Machines for Bending Tire:

We claim the scroll-shaped stationary former, the mode of holding the end of the bar to be bent, the manner of adjusting the friction roller by the wedge-shaped key through the lever bearing against the center bolt, all in combination as specified, and for the purposes set forth.

27,144.—Thos. Murphy, of Cincinnati, Ohio, for an Improvement in Cultivators:

I claim the described arrangement of the plow frame, AC D E F, detachable mold boards, K, and detachable cultivator franics, N O, the whole being constructed and operating in the manner and for the several purposes set forth.

27,145.—Walter Nangel, of Philadelphia, Pa., for an Improved Mortising Machine:

I claim the employment of rotary reciprocating cutters in mortising machines, substantially in the manner and for the purpose set forth.

27,146.—Charles Neames, of New Orleans, La., for an Improvement in Bagasse Furnaces:

I claim the use of chambers in wet fuel furnaces which have their receiving openings exclusively in and from the interior of the furnace, to receive the vapors arising from the fuel, and which will convey and distribute the same at points to meet the carbonaceous gases, to allow the oxygen from the vapor to be brought in contact with highly heated carbon, to support combustion.

I also claim the hollow pillars mounted on wall, A, in combination with flue, c, when arranged and operated as and for the purpose set forth.

27,147.—Edward O. C. Ord, of the United States Army, for an Application of Gunpowder to Flat Projectiles, giving them Rotation:

I claim the use and control of the projectiles discharged from fire-arms or not by hand, and rotating in their flight, substantially as described.

27,148.—Josephus Parsons, of Carthage, Ohio, for an Improved Rotary Steam Engine:

I claim the construction and arrangement of the wheel, B, provided with radial shuttle valves, D, and the steam chambers; the said valves and the wheel itself being operated by steam, in combination with the cams which also serve as stationary pistons, substantially as set forth, for the purposes described.

27,149.—W. A. Patrick, of Ludlow, Vt., for an Improved Method of Operating Feed Nuts in Lathes:

I claim the yoke, C, connected with the hand lever, E, and spring, F, and also connected with the sliding plates, b b, of the sections, c c, of the nut by means of the pins and slots, e e d d; the whole being arranged to operate as and for the purpose set forth and described.

[This invention relates to an improved means for operating or adjusting the two parts of a divided nut, so that the same may be made to engage with or be disengaged from the feed screw, which, when the nut is engaged with it, gives the feed movement to the carriage containing the knife. The object of this invention is to obtain a simple and efficient mechanism for the intended purpose, one that may be readily operated, not liable to be deranged or rendered inoperative by use, and one that can be retained in the two positions necessary to keep the nut in an open or a closed state, and also due provision made for wear.]

27,150.—N. A. Patterson, of Kingston, Tenn., for an Improvement in Harrows:

I claim the arrangement of the shafts or side rails, D, with the mechanism for vibrating them, substantially as and for the purposes set forth and described.

[This invention consists in attaching the teeth of the implement to shafts which have a vibratory movement imparted to them as the implement is drawn along, whereby the teeth are relieved from all trash, weeds, &c., which are liable to adhere to them; the seed, if the implement is drawn over seeded ground, more effectually covered and better distributed in the earth than formerly; the earth more thoroughly pulverized; and the implement rendered of lighter draft than those of usual construction.]

27,151.—Edmond Peck, of San Jose, Cal., for an Improvement in Harvesters:

I claim the arrangement of the vertical rod, j', racks, m' m' lever, N, spring plates, n' n', rods, o o', perch, J, apron box, F, axle, I, and clutches, j p, as and for the purpose shown and described.

27,152.—C. M. Plumb, of North Orange, N. J., for an Improved Time Table for Railroads, &c.:

I claim the within-described construction of frame and movable slides with the separate movable plates with letters or numerals denoted thereon; the whole being combined, arranged and operating for the purposes and in the manner described.

[The object of this invention is to obtain a cheap and ready reference time table for railroad stations, for giving information to persons traveling over certain routes, and to serve as a perpetual railroad directory, showing the time of departure of the trains leaving the station during the day or night. The table is to be made so that

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malicious persons cannot injure or deface it by tampering with it, and so that the numerals or letters used upon it may be taken out with very little trouble and others inserted in their places. The whole device is made light, neat and portable, and may be hung up out of reach, or nailed up on the inside of the cars, in the house or out of doors]

27,153.—Charles Pope, of Syracuse, N. Y., for an Improvement in Apparatus for Evaporating Saline Liquors:

I claim the hollow angle pieces constructed and arranged substantially as described and for the purpose set forth.

I also claim making the arms of the kettles hollow, as set forth and for the purpose stated.

I also claim combining the hollow angle pieces with the air spaces, D, upon the sides of the arch, when so arranged that heated air may pass from the spaces upward through the angle pieces, and be discharged over the boiling liquid in the kettles, as set forth.

27,154.—D. J. Powers, of Madison, Wis., for an Improvement in Straw-cutters:

I claim, first, The arrangement of the adjustable ledger blade, I J, in combination with the upward-cutting knives, G, of the cylinder, D, curved slot, R, compensating pinions, Q1 Q2 Q3 Q4, weighted lever, S, and feed roller, M, substantially as and for the purposes set forth.

Second, The arrangement of the cone or gear wheels, L, on the feed roller shaft, with the compound pinion, C, of the knife cylinder, substantially as and for the purposes set forth.

[This straw-cutter has its knives arranged on a revolving cylinder so as to cut upward against a stationary adjustable blade. The lower feed roller, which is fluted and made of metal, is adjustable in a curved slot, and is so arranged with four gear wheels, that no matter what be the adjustment it always is in gear with the driving mechanism. A weighted lever holds the feed roller with a yielding pressure against the upper fluted metal feed roller on the straw passing between the two rollers. The speed of the feed roller is regulated by a cone of gear wheels on it, and a sliding pinion on the cutter shaft. The arrangement, as a whole, seems well adapted for cutting straw, corn stalks, and other feed.]

27,155.—Thomas E. Purchase, of Danville, Pa., for an Improvement in Grates for Furnaces:

I claim the combination of a series of comb-like bars each interlocking the other and capable of being oscillated independently of the other, substantially as specified, for the purposes set forth.

27,156.—Joseph Reynolds, of Providence, R. I., for an Improvement in Marine Propellers. Patented in England May 26, 1859:

I claim the double cranks supported by outside bearings with the propeller frames supported by stay rods and guided at the top with two radius rods to each frame hung to the vessel, or suitable frames attached to the vessel abaft the main shaft to which the propeller frame is connected. The radius rods to be of a suitable length and hung in a proper position to hold or guide the top of the frame forward, or beyond the shaft to which it is attached; the whole constructed and arranged substantially as and for the purposes specified.

27,157.—Aaron Ring, of Westbrook, Maine, for an Improvement in Seeding Machines:

I claim the combination of the wheel, A, which is open at both ends, with wheel, B, both wheels placed upon the same axis and rotating in opposite directions in combination with two shafts, C and D, one within the other, substantially as and for the purpose set forth.

27,158.—Wm. Robotham, of Newark, N. J., for an Improved Gag-runner:

I claim constructing the two loops in one piece and arranging them substantially as described.

37,159.—Fisk Russell, of Manchester, N. H., for an Improvement in Mowing Machine Cutters:

I claim the combination of the wings or projections, C, with the blades, A, when the latter are pivoted and when the said projections are arranged to operate in connection with the guards as and for the purpose set forth.

27,160.—Thomas Sault, of Seymour, Conn., for an Improvement in Rollers for Working Caoutchouc and Allied Gums:

I claim the breaking down, comminuting and cleaning of crude commercial vulcanizable gums, separating them from foreign bodies by toothed rollers, substantially as set forth, whether the rollers be in pairs or in threes or any other number.

27,161.—Wm. H. Sloan, of Buffalo, N. Y., for an Improved Machine for Dressing Staves:

I claim, first, The feed roller, N, having the gage, n, in combination with the cutters, J J, when the said feed roller is so placed and arranged with reference to the cutters and other parts of the machine as that the stave will be fed to the cutters, in such relative time and motion, as to cause the middle of the stave to be dressed while the cutters are in their lowest position, substantially as herein described.

Second, I claim the combination and arrangement of the gage, n, with a pressure or feed roller, N, whose circumference is equal to or greater than the length of the longest stave to be dressed; the said gage being adjustable on the face of the roller so as to cause the middle of a long or short stave to be dressed by the cutters while in their lowest position, substantially as set forth.

Third, I claim the relative arrangement of the annular rim or feed bed, B, friction rollers, E E1 and E2, and pressure rollers, T and T1, for the purpose set forth.

Fourth, I claim the combination of the rotating bed, having a roughened surface, with the pressure rollers, T and T1, for the purposes and substantially as described.

27,162.—Jonathan Smith, of Tiffin, Ohio, for an Improvement in Seed Drills:

I claim the thin metal corrugated wheels, D, and ratchet washers, E, conforming therewith in lateral surface, in combination with shaft, A, collars, F, and concave hopper bottom, B; the operation being as set forth.

27,163.—Wm. W. Spafford, of Peterborough, N. H., for an Improvement in Railroad Car Wheels:

I claim the construction of a car wheel formed with curved or corrugated shell side surfaces, c c d d, and internal diaphragms or partitions, f f f f, forming one or more internal cells, cavities, chambers, or spaces, g g h h, when said surfaces and diaphragms are so arranged as that the incumbent downward weight or pressure acting thereon shall be in a direction vertically throughout said parts of the wheel, substantially as set forth and described.

27,164.—Otis W. Stanford, of Cincinnati, Ohio, for an Improvement in Grinding Mills:

I claim the combination of grinding surfaces composed of spiral ridges, separated by cavities which shoal or feather diagonally as set forth.

27,165.—Daniel D. Stelle, of New Brunswick, N. J., for an Improved Acoustic Apparatus:

I claim the combination with a pulpit or reading table, of the sound receiver, a a, and conducting tube, c, substantially as and for the purpose shown and described.

27,166.—George K. Snow, of Watertown, Mass., for an Improvement in Folding Paper for Bookbinders:

I claim folding each sheet with back folds and into two connected signatures having their connection along or adjacent to and between the front edges to be trimmed, and so that the said connection may be trimmed or separated with such front edges from the rest of the paper while they are being trimmed; my process involving the back folding of the sheet one or more times in making the first folding, and the back folding of it twice or other suitable greater number of times in making the second folding, or that which is at right angles to the first folding.

27,167.—Joseph Storm, of Woonsocket, R. I., for an Improvement in Paper Rag Engines:

I claim the employment of the conductor, H, in combination with the rotary drum, B, the rotary cutter cylinder, D, and the stationary knives, E, arranged substantially as and for the purpose specified.

[A description and engraving of this invention will appear in the SCIENTIFIC AMERICAN in a few weeks.]

26,168.—Noah Sutton, of New York City, for an Improvement in Slide Valves:

I claim the arrangement of the two pistons, E E′, and cylinders, C C′, between the two heads of the double D-valve, or what is equivalent, between two short connected D-valves, with a single steam passage in each of said cylinders, and an exhaust passage common to both of said cylinders communicating through the partition between the said cylinders with the main exhaust passage, substantially as described.

[This invention relates to the operation of the slide valves of steam engines by the direct pressure of steam upon pistons attached to the valves themselves; and it consists in a novel manner of applying such pistons and the cylinders in which they operate, and of arranging the ports and passages of such cylinders, whereby great simplicity of construction is obtained.]

28,169.—Wm. Swift, of Brooklyn, N. Y., for an Improved Invalid's Bedstead:

I claim, first, The combination of movable frame, D, with mattress frame, B, jointed pieces, G, and weights, F, all arranged and operating in the manner and for the purposes set forth.

Second, The frame, B, when the same is pivoted to the head and foot rails, as and for the purposes described.

27,170.—H. K. Symmes, of Newton, Mass., for an Improvement in Mode of Extinguishing Gas-lights:

I claim the extinguishing of gas-lights by means of an inverted cup, B, or its equivalent expanding chamber provided with an inlet valve, a b, so applied, substantially as herein described, in combination with the burner or supply pipe that though it will be caused to effect the shutting off of the gas, by a temporary increase or diminution of pressure, it will not permit the renewal of the supply to the burners to be effected by a subsequent diminution or increase of the pressure.

[This invention consists in certain means whereby all the street lights or out-door public lights of a city, town, village or district may be extinguished by simply effecting such a temporary increase or reduction of the pressure on the main as will not materially interfere with the lights in dwellings and other places, by the agency of a cock or valve at the gas works, such means serving also to extinguish the lights of any series of burners by a temporary increase or diminution of pressure that will not materially affect the lights of other burners supplied by the same main or service pipe.]

27,171.—B. F. Trimmer, of Rochester, N. Y., for an Improvement in Grain Separators:

I claim inducting the grain to the screens, f m, through the concentrated currents of two blasts by the small throats, a c, of division, G, and d, of division, H, the blast through A having an upward or convex, and that through c, a concave direction to the falling grain, substantially in the manner and for the purposes described

I also claim the combination and arrangement of the perforated sheet metal screens having a section of larger orifices, f, in communication with division, G, and of smaller orifices, m, with divisions, H, of the chamber of separation above, substantially as and for the purposes described.

I further claim the arrangement and combination of the opposing segmental arms, L, crank, o, and spindles, S S, with the screen box, E, for giving the desired direction to the vibrations of the screens, and regulating the same, substantially as set forth.

27,172.—Francis Van Doren, of Adrian, Mich., for an Improvement in Hand Seed Planters:

I claim, first, The arrangement of a secondary hopper, A, at the front side and near the bottom of the planter for the seed which is brought from the main hopper by a roller connected to the plunger to fall into and thus be in sight of the operator until it is forced in the ground, substantially as and for the purposes set forth.

Second, The arrangement, H i j, for operating the device, G, which scrapes the dirt off the discharge end of the planter, substantially as and for the purposes set forth.

[This is a good hand planter. The secondary hopper at the back of the seed box enables the operator who carries the planter in his hand to see whether seed is brought down from the seed box every time the planter is operated at a new hill. The scraping device always keeps the end of the planter free from an accumulation of dirt, and thus prevents clogging.]

27,173.—E. L. Vertrees, of Howe's Valley, Ky., for an Improved Mode of Cutting Boot Vamps:

I claim in combination with cutting a boot vamp without crimping, removing the pointed portion of the material, M X N Y, in the side of the ankle, and joining the edges so as to contract the back at O. and incline the leg forward, substantially as and so as to obtain the advantages set forth.

27,174.—Joseph Vowles, of New Hudson, Mich., for an Improvement in Cultivators:

I claim, in combination with the series of hoes or plows, L L, the pair of front hoes or plows, N N, constructed, arranged and made adjustable in the manner and for the purposes herein described and represented.

I also claim the peculiar construction, combination and arrangement of the frame, the pulleys and the locking of the standards to the frame, substantially as described and for the purposes set forth.

27,175.—Edwin Ward, of New York City, for an Improved Churn:

I claim the churn made up of a horizontal cylinder having ribs, as described, and an interior shaft armed with dashers; the cylinder being made to rotate in the one direction, and the shaft and dashers in the opposite direction, as set forth.

27,176.—Edward Webster, of Hartford, Conn., for an Improvement in Gridirons:

I claim the folding and revolving broiler, in the manner as described, in combination with the frame and cover, substantially as described and for the purpose set forth.

27,177.—W. R. Webster, of Gowanda, N. Y., for an Improvement in Tanning:

I claim the use of chloride of lime, in combination with the materials specified, or with any materials used in the ordinary process of tanning.

27,178.—Decatur Werst and Aaron Puderbaugh, of Waltz township, Ind., for an Improvement in Lathes for Turning Irregular Forms:

We claim the combination of the vertically-reciprocating cutters, c, with the longitudinally-traveling carriage, B, and laterally-sliding gage, E, by the means and in the manner substantially as described, for the purpose set forth.

[This machine differs from all others which have preceded it, in employing a reciprocating cutter instead of a revolving one. The reciprocating cutters possess an advantage over rotating cutters in being capable of cutting spokes and other articles which require to be broad and flat at one end. The cutter is guided by a pattern, which, with the article being operated upon, revolves. We regard this as a very useful machine.]

27,179.—Calvin D. Wheeler, of New York City, for an Improvement in Marking Gages for Sewing Machines:

I claim combining with a sliding rule, arranged as described, the spring point for the purpose of measuring and marking material for folding to facilitate the operation of guiding said folds through a sewing machine for the successive stitches, as set forth and specified.

27,180.—Stephen Wilcox, Jr., of Westerly, R. I., for an Improvement in Hot-air Engines:

I claim, first, The dividing of the changing piston into two parts, 1 2, and conducting the air through the space between them in its transfer from the cold to the hot end of the cylinder, substantially as and for the purpose set forth.

Second, Dividing the bearing, X, or its equivalent, from the heated portion of the working piston by the space, Q, which space is in free communication with the external atmosphere, so that the heat is conveyed away by connection, substantially in the manner set forth.

Third, The arrangement of the exhaust valve, T′, hollow piston rod, 3 and 4, and guide case, 6, or their respective equivalents, for the purposes set forth.

Fourth, The combination and arrangement of the crank, C Z, adjustable eccentric, Y, and eccentric rod and connections, or their respective equivalents, for the purpose of working a valve, the seat of which is carried in or with the piston, substantially as set forth.

27,181.—Abner Willson, of Colden, N. Y., for an Improved Churn:

I claim the bow, F, with springs, a, when constructed as described, in combination with screw whirl, D, operating as set forth and for the purposes described.

27,182.—August Wulze, of St. Louis, Mo., for an Improvement in Smut Mills:

I claim arranging and operating the cylinder, D, and beater, B, with respect to each other as and in the manner described, not per se, but when the said cylinder is made with the opening, S, in one end (as at Fig. 5), and with its surface perforated with a flat punch upon diagonal lines, and when the said beater is made with the blades set diagonally across its axis in the manner described for the purpose specified.

27,183.—Charles J. Appleton, of Philadelphia, Pa. (assignor to B. H. Howell, of New York City, and John Cotton, of Philadelphia aforesaid), for an Improvement in Knitting Machines:

I claim the system of hinged needles and "sinkers," in combination with the thread guide, J, and the cam, K, and serrated wheel, I, or their equivalents; the whole being arranged and operating substantially as set forth.

27,184.—Gotleib M. Barth, of Philadelphia, Pa. (assignor to himself and D. D. Jones, of same place), for an Improvement in Weighing Carts:

I claim, first, Connecting the frame, D, with its bars, H and H′, to the axle, A, so as to be confined laterally and longitudinally to the said axle, and so that it may be elevated above the same, either perpendicularly or on one side more than the other, as and for the purpose set forth.

Second, The shaft, E, with its projections or cams, i i, and the projections, j j, on the axle, A, in combination with the frame, D, the bars, H and H′, with sharp-edged projections, n n, and the body, X, of the cart; the whole being so arranged that, on turning the said shaft in one direction; the body of the cart will be supported solely by and on the said sharp-edged projections, and on turning the shaft in a contrary direction, the body of the cart shall be supported on the axles and the bars, H and H′, on the shaft, E, as specified.

Third, The graduated lever, M, connected to the bars, H and H′, by the arms, J and K, and link, q, in combination with the plate, N; the latter being jointed to, and rendered adjustable on, one of the shafts, C, and the whole being arranged substantially in the manner set forth.

Fourth, The shaft, E, with its projections, w w, in combination with the plates, u u, on the underside of the body, X; the whole being arranged as set forth for the purpose of retaining and releasing the said body.

27,185.—Abner Burbank, of Brooklyn, N. Y. (assignor to George W. Burbank, of Rochester, N. Y.), for an Improvement in Soldering Irons:

I claim, first, The combination of the soldering tool or iron with any suitable gas supply, when the arrangement is such that the solering tool may be constantly supplied with gas, and the "copper" maintained in a heated state while the tool is being used by the workman, substantially as shown and described.

Second, I claim the combination of a gas light with a soldering tool or iron to illuminate the interior and other parts of the work to which the tool may be applied, substantially as shown and described.

Third, The employment of a chamber, a, in the base of the copper, A, as and for the purposes shown and described.

Fourth, The employment of a tubular screw, B, in combination with the copper, A, and cylinder, C, as and for the purposes shown and described.

27,186.—Thomas B. DeForest, of New York City (assignor to himself and Wallace & Sons, of Ansonia, Conn.), for an Improvement in Lanterns:

I claim forming, out of a vertical piece of wire, two of the vertical guard wires, substantially as set forth.

I also claim bending the double guard piece of wire, a, into such shape as to form the connecting link for the attachment of the handle as specified.

I also claim forming the support for the protector, C, out of one of the double guard wires, as shown and described, in combination with the retaining portion of the other extended wire, as set forth.

I also claim the peculiar construction of the handle, D, as specified for the purpose set forth.

27,187.—John R. Henshaw, of Middletown, Conn. (assignor to himself and Samuel Babcock, of same place), for an Improvement in Skates:

I claim the plate, k, made so as to be adjusted on the bar, f, or its equivalent, and the thumb screw, h, as means for securing the heel of the boot or shoe to the skate as set forth.

27,188.—Wm. H. Johnson, of Richmond, Ark. (assignor to himself and J. D. Bellah, of same place), for an Improvement in Plows:

I claim constructing the beam of the draught block, a, and bent strip of iron, b, arranged and combined as specified.

I also claim the ring, D, in combination with the beam, A, and share standard, E, constructed, arranged and operating substantially as specified.

27,189.—Joseph Lamb, of New York City (assignor to himself and Richard Lamb, of same place), for an Improvement in Portable Sleds:

I claim, first, A folding sled as a new article of manufacture, the parts being hinged together and capable of being instantly expanded into a rigid sled, or folded in a small compass, as set forth.

Second, I claim, in a folding sled, the described combination and arrangement of the grooved braces, B, cross braces, C, and runners, R, whereby the sled, when folded, occupies a thickness equal only to that of the braces, B or C, themselves.

Third, I claim, in connection with the last, the described arrangement of the back frame, A, by which it is folded into the plane of the braces, B C, and runners, R.

Fourth, I claim, in a folding sled constructed substantially as described, the employment of the flexible or hinged foot rest, E, so arranged and suspended as to secure the advantages set forth.

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27,190.—Wm. H. Lauback, of Philadelphia, Pa. (assignor to himself and D. C. Enos, of same place), for an Improvement in the use of Hydro-carbon Vapor for Illumination:

I claim forcing into and through the distributing pipes hydro-carbon vapor, at such a high temperature that no condensation of the vapor can take place in the said pipes, when the latter are so arranged that no closing of the burners can obstruct the free circulation of the heated vapor throughout every portion of the said distributing pipes as and for the purpose set forth.

27,191.—Isaac P. Lykens, of Pottsville, Pa. (assignor to himself and Wm. Bickel, of same place), for an Improvement in Machinery for Breaking Coal:

I claim, first, The reciprocating spiked plates, I, and the spiked bars, N, in combination with the chutes, Q, and their movable doors, q; the whole being arranged and operating substantially as set forth.

Second, Attaching both the upper and lower spikes, independently of each other, to the bars in such a manner that the position of the said spikes may be altered at pleasure, the bars themselves being likewise so secured as to admit of ready adjustment, in the manner and for the purpose specified.

Third, The spring, M, arranged in respect to the spiked plate, I, and the spiked bars, N, as and for the purpose set forth.

27,192.—David Nicholson, of Lockport, N. Y. (assignor to himself and Charles R. Fox, of same place), for an Improved Method of Feeding the Bolt to the Knife in Shingle Machines:

I claim, first, Constructing the racks, R R, of two toothed longitudinal parts, v w, so arranged as to be capable of adjustment one with the other, for the purpose of varying the taper of the shingles and sawing "stuff" of equal thickness throughout when desired.

Second, The arrangement of the racks, R R, slides, S T, connected by the lever, U, and the slotted slides, M N, operated by the lever, O, and crank, g', and fitted in the bar, L, substantially as shown, for the purpose of actuating the racks, R R.

27,193.—Enos B. Phillips, of Cambridgeport, Mass. (assignor to himself and Charles W. Phillips, of same place), for an Improvement in the Manufacture of Skates:

I claim, as a new article of manufature, a skate cast from the described composition metal, substantially as set forth.

27,194.—James Spear, of Philadelphia, Pa. (assignor to himself and D. C. Enos, of same place), for a Post-office Stamp:

I claim, first, Constructing a stamp or die with letters, the outline of which is composed of fine points, constructed in the manner and for the purpose described.

Second, I claim stamping letters so that the letter, as well as the envelope, will bear the post-office mark in a distinct manner, as described.

RE-ISSUE.

George Westinghouse, of Schenectady, N. Y., for an Improvement in Endless Chain Horse-powers. Patented June 13, 1854; re-issued July 10, 1855; again re-issued Feb. 14, 1860:

I claim, first, The combination of the straight links, c, and odd links, i, when constructed, arranged and operating as described.

Second, The combination and arrangement of the hubs or pinions, m m', with the band and driving wheels, as described, for the purposes.

DESIGNS.

Elemer J. Ney, of Lowell, Mass. (assignor to the Lowell Manufacturing Company, of Lowell, Mass.), for a Design for Carpet Patterns.

William W. Stevens, of Portland, Maine (assignor to N. P. Richardson & Co., of same place), for a Design for a Cooking Stove.

N. S. Vedder, of Troy, N. Y., for a Design for a Parlor and Cook Stove.

N. S. Vedder, of Troy, N. Y., for a Design for a Parlor Stove.

Leonard W. Volk, of Chicago, Ill., for a Design for Statuette of Stephen A. Douglas.

Notes & Queries

W. M. M., of Ill.—We published a series of illustrated articles on artesian wells in Vol. VIII (old series) of the SCIENTIFIC AMERICAN.

F. N. C., of Mich.—We gave the information about soaps on page 3, present volume of the SCIENTIFIC AMERICAN, just as it was in the patent.

H. G., of Ohio.—The specimen of ore which you have sent us appears to be alumina, and may contain sufficient metal to render the smelting of it profitable; this, however, can only be determined by experiment.

W. B., Jr., of N. Y.—No mirror can form an image in the atmosphere. Some person must have given you wrong information on the subject.

W. J., of Ky.—Measure the amount of water that flows from your spring by the rule which we gave in our last number, and you will be able to form a very good opinion whether it will be an object for you to get one of Tyler's wheels, or not.

F. K., of Pa.—The ink powder which you have sent us is composed of extract of logwood and the bi-carbonate of potash.

E. H. R., of Mass.—Steam has been applied as a motive power by injecting it into a box containing a wheel, which was thus made to revolve. An engine of this character was exhibited in this city about ten years ago.

J. W. P., of Mass.—Percussion powder for caps is made with both fulminating quicksilver and chlorate of potassa; the former is the better. It is ground to fine powder with water on a marble slab by a wooden roller; then mixed with equal parts of saltpeter and a little resin varnish, and is thus dropped into a cap. It is a dangerous agent to operate with. You must be very cautious in using it.

C. W. C., of N. Y.—In making telescopes the glasses are adjusted to each other by practical experiment. They are placed temporarily in a tube, and when the proper positions are found, the places are marked and then the glasses are permanently secured. J. Prentice, No. 66 Nassau-street, will give you practical directions in this matter. He is an old established and respectable optician.

R. C., of Ill.—You propose to store up power by a windmill by raising weights to a certain elevation, to be afterwards employed when there is not a sufficient amount of wind to operate the wheel. A more simple plan has oftentimes been proposed to us, namely, to pump up water into a reservoir, by a windmill, when there was plenty of wind, then use the water to drive a wheel when there was no wind to drive the mill. In some situations, we might use this plan, and we advise you to adopt it in place of using such a clumsy substitute in the form of elevated weights.

E. J., of Ohio.—Your directions for cutting elbows for stove pipes would be valuable if we had not already given one that answers the purpose.

J. R. W., of Iowa.—By a communication in another column you will see that the parallelism of the cracks which you observed in the frozen mud, was owing to some local cause. It is curious that they should be thus parallel over even a very small district.

D. W. B., of Conn.—We think the objections to galvanized iron for conveying water to a house are less powerful than the objections to lead. But we have seen such dreadful effects from metallic poison, and have found the cement pipes so perfect, that we recommend them in all cases where they can be used.

J. N. V. L., of Va.—We have received your theory in regard to the aurora borealis and examined it, but we do not believe that it would be as interesting to our readers generally as it is to you. We suppose men's theories are very much like their children, or their indigestions, matters of interest to themselves, but decided bores to other people. Your theory is as likely to be correct as that of some of the learned savans, and this probability we should estimate, in the present state of human knowledge, at about one in 10,000,000,000.

R. C. M., of C. W.—There are steam gages for measuring the pressure in pounds per square inch in the boiler, but no gage can give the horse-power of the engine.

F. P., of Iowa.—A bill has been introduced into our legislature with a provision similar to the one which you recommend for preventing persons being burnt in the buildings. This plan of iron stairs in the rear, outside, seems to be very judicious.

D. H. C., of Mass.—We suppose you refer to Shepard's motor. The fall must be sufficient for the water to rise in the pipe by its momentum from the velocity of the current.

E. B., of N. Y.—The Atlantic cable was very imperfectly constructed, and it was too small for practical purposes. Several patents have been obtained in the United States for submarine cables. We believe that a cable may be constructed and laid in the ocean to operate satisfactorily, but the messages would necessarily be slow in passing.

C. W. D., of S. C.—Any turbine, set upon a horizontal shaft and revolving with a high velocity, may give out as much power as a common tub wheel, but such an arrangement cannot affect the question of economizing the water, which is the important item with you. We advise you to get the best turbine wheel possible for your fall, irrespective of the conditions of being hung either on a vertical or horizontal shaft.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, Feb. 18, 1860:—

T. D. C., of N. Y., $55; L. C. R., of N. J., $30; D. M. S., of Vt., $30; J. B., of Del., $30; H. G., of La., $35; L. R. S., of Mich., $10; S. D., Jr., of S. C., $30; M. & M., of N. Y., $30; J. S., of Mass., $21; G. K. B., of N. Y., $30; J. C., of N. Y., $30; I. N. R., of Iowa, $25; W. & P., of N. Y., $30; B. W. T., of N. Y., $25; S. M. W., of Mich., $25; D. L. M., of N. J., $55; D. H., of Ill., $30; A. H., of N. Y., $30; C. P., of N. Y., $25; G. W. G., of N. Y., $25; C. P., of N. J., $25; F. H., of N. Y., $40; J. P., of Pa., $25; H. W., of N. Y., $57; E. B., of Conn., $55; B. E. O., of Ill., $35; T. H. G., of Wis., $30; B. & F., of Pa., $25; F. F., of N. Y., $30; J. O. G., of Conn., $30; W. B., of N. Y., $30; A. H., of Md., $25; R. H. F., of Pa., $25; J. C. C., of Conn., $30; J. W. C., of Maine, $25; M. M., of Md., $30; D. E., of Ill., $35; A. H., of Ohio, $30; M. & M., of N. Y., $30; J. L. H., of N. Y., $25; J. T. L., of L. I., $10; J. B. T., of Ill., $30; A. & L., of Conn., $250; J. B. L., of Tenn., $30; E. C. S., of Md., $55; G. W., of N. Y., $55; J. A. C., of Conn., $15; N. H. H., of Wis., $30; N. & H., of N. J., $25, O. S., Jr., of Iowa, $25; E. & D., of Mass., $20; S. & L., of N. Y., $30; C. W. R., of Ga., $30; C. & B., of N. Y., $30; A. E. D., of Ill., $25; W. S., of N. Y., $30; W. G., of Ohio, $30; G. M., of Conn., $30; W. H. S., of Conn., $25; C. P. B. and others, of Conn., $25; F. W., of N. Y., $25; W. B. & R. B., of N. Y., $12; A. B. S., of La., $55; J. C., of Conn., $10; F. T., of Ill., $30.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Feb. 18, 1860:—

F. W., of N. Y.; J. L. H., of N. Y.; W. J. B., of Pa.; G. W. G., of N. Y.; J. P., of N. J.; N. H. H., of Wis.; H. G., of La.; J. N. R., of Iowa; F. H., of N. Y.; B. W. T., of N. Y.; C. & W., of N. Y.; C. P., of N. Y.; G. W. G., of Conn.; J. A. C., of Conn.; J. S., of Mass. (2 cases); B. E. O., of Ill.; H. W., of N. Y.; E. B., of Conn.; J. T. L., of L. I.; S. M. W., of Mich.; G. W. R., of N. Y.; C. B. M., of N. Y.; S. B. D., of N. Y.; M. S. S., of N. Y.; W. B. & R. B., of N. Y.; N. & H., of N. J.; R. A. S., of N. Y.; E. C. S., of Md.; C. P. B. and others, of Conn.; W. H. S., of Conn.; R. H. F., of N. J.; J. W. C., of Maine; A. E. D., of Ill.

Literary Notices.

CENTENNIAL BIRTHDAY OF ROBERT BURNS. Edited by J. Cunningham; published by Lang & Laing, 170 Fulton-street, this city.

This is the title of a neat little volume containing the oration of Rev. Henry Ward Beecher and all the eloquent speeches delivered at the Astor House, by the Burns Club, on the 25th of January, 1859. It also contains several beautiful poems on the genius of Burns. Whittaker's tribute is a gem; but towering above them all is the Baltimore prize poem of Thomas Frazer, a mechanic of Newark, N. J. It is written in the Scottish doric, with the swing and pathos of a true poet.

NEW HAMPSHIRE JOURNAL OF EDUCATION. Published by the State Teachers' Association, Concord, N. H.

We have received the second number of Vol. IV. of this neat publication, and are pleased to see that it is sustained. The mechanical and commercial prosperity of the country, as well as the maintenance of our free institutions, depends upon the education of the people. It is altogether the most important interest we have.

IMPORTANT TO INVENTORS.

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Consultation may be had with the firm, between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH-STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at their office.

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CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

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Your obedient servant, J. HOLT.

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IMPROVED CORN PLANTER.

The inhabitants of our western prairies understand the cultivation of Indian corn better than it is understood in any other part of the world. A person may ride among those square miles of waving verdure without ever seeing a crooked row of corn, or a single short row at the edge of the 160-acre fields; with such engineering accuracy do these farmers lay off their ground. And while the corn is growing, one man with a double shovel plow will keep 20 or 25 acres perfectly free from weeds, notwithstanding that weeds grow with surprising vigor in that fertile soil. In order that corn may be cultivated thus perfectly with so little labor, it is absolutely necessary that it should be planted in rows both ways, and many attempts have been made to devise some machine which would do this. Twenty years ago we ourselves expended considerable inventive effort upon this problem but without any really valuable result. The accompanying cut represents a machine which accomplishes the thing to a degree of perfection, though it takes two persons to operate it, and requires that the ground should be previously furrowed in one direction.

Fig. 1

Fig. 2

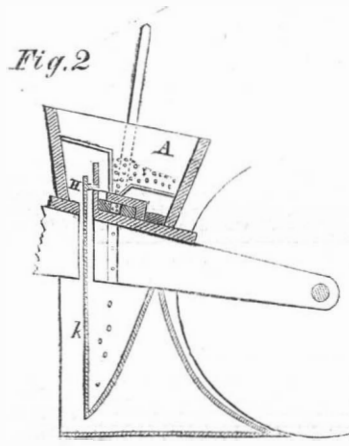
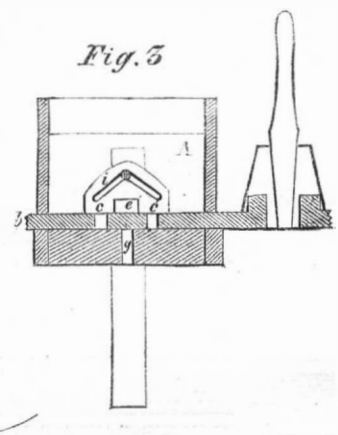


Fig. 3



WORTH'S CORN PLANTER.

A frame is supported upon two broad wheels which are placed the proper distance apart for two rows, and carries two hoppers for the seed on its forward part, in front of the wheels. One long slide passes through the bottoms of both hoppers, and is furnished with two holes near each end for measuring the seed and feeding it down into the shoes which open the furrows. This slide is worked by means of the lever, *d*, the attendant boy forcing it along at the instant the heel of the shoe is the middle of the furrow which is being crossed. This motion passes one of the holes, *c*, with its measure of seed under the stationary scraper, *e*, and over the opening, *b*, by which means the proper number of seed for one hill is dropped down into the hollow shoe, *h*, near its bottom, where the seed is arrested and retained by the slide, *k*, Fig. 2. This slide is a thin plate, and, passing through the bottom of the hopper, has a projecting pin, *n*, near its upper end. This pin passes through the angular slot, *i*, in a plate fastened upon the slide, b, so that when this plate is moved horizontally with the slide, *b*, the slide, *k*, is momentarily raised, allowing the charge of seed which it retained to fall into the furrow. At the same time another supply of seed is dropped down into the hollow shoe where it is caught by the return of the slide, *k*, to its place and held till the furrow is reached for the succeeding hill.

The frame on which the working parts rest is made independent of the frame to which the wheels and pole are attached, and is hung on pivots, so that the driver by moving backward upon the long seat on which he sits astride, can raise the shoes out from the ground—a convenience in turning round at the ends of the rows, and in proceeding to or from the field. In front of the shoes, *h*, are the wheels, *o*, made in the form of double cones, to prepare the ground for more complete opening by the shoes, *h*. The carriage is supported by the broad wheels which keep it from sinking into the soft plowed ground, and which follow the planting, covering the seed and pressing the earth around it.

The patent for this invention was granted through the Scientific American Patent Agency, Dec. 13, 1859, to William H. Worth and Leonard Finlay, who have sold a one-half interest, and persons desiring further information in relation to the matter will please address Rees, Worth & Co., at Canton, Mo.

THE EFFECT OF PATENTS ON THE PRICE OF MANUFACTURED GOODS.

In our last number we announced the fact that the Commissioner of Patents had rejected the application of E. B. Bigelow, for an extension of his patent of February 18, 1846, for an improvement in power-looms for weaving ingrain carpets. We do not propose now to discuss the merits of that decision. Our object is to notice a statement made by a correspondent of one of our city cotemporaries, wherein he asserts (as a ground of justification for the Commissioner's rejection in this case) that "ingrain carpets will no doubt be sold cheaper in consequence." Such a statement is not founded upon fact; it is simply an opinion, but one which, nevertheless, requires correction, as it suggests the idea that its author (and perhaps many others) entertains the notion that articles—such as carpets—manufactured by patented inventions are higher in price as a consequence of such patents. The public should be disabused of such an absurd notion, for it is wrong in essence and principle. The very first thing which a patented improvement in a machine effects is a reduction in the price of the articles manufactured by it. This has been the case with the carpet power-loom. The dyes and the wool of carpets are as high in price to-day as they were before this loom was put in operation, but carpets are 10 per cent. cheaper, at the very least, and this reduction in price has been effected by the economy of labor accomplished by machinery.

There is another wrong idea prevalent in the minds of many persons in regard to patents, which also requires correction. They believe that, as patents secure an exclusive right to the manufacture, sale and use of certain articles, this is a monopoly which keeps up prices, and that if no patents were granted, such articles would be much cheaper. The fact is that, but for patented inventions, most of the improved manufactures which are now produced by machinery would be vastly dearer than they are, and many of them would not be in existence at all. If inventors were not protected for a certain period of time in the exclusive enjoyment of their inventions, by the grant of Letters Patent, they would not be so foolish as to spend time, money and mental toil in effecting improvements that could and would be afterwards appropriated by any person, without cost or labor. And as it requires quite a large capital to engage in most new manufacturing operations, capitalists would not invest money in expensive new undertakings of this character, unless they enjoyed protection until once they had fully established the business. The consequence, therefore, would be that they would not invest, and we should not have such manufactures at all. Take the very patent of the carpet power-loom, and we have no hesitation in asserting that, had it never issued from the Patent Office, the loom would not yet have been in operation; and all carpets would still be woven by hand, and the high prices thus maintained. We are positive that the public cannot obtain cheaper carpets on account of the Commissioner's recent decision; because patents do not keep up high prices. But even allowing that they do so, then, as Mr. Bigelow has several other patents on different parts of carpet-power-looms, and as these will remain in full force a number of years longer, of course the old prices must still be continued on this very account; so that the correspondent of the cotemporary to whom we have referred has no grounds—on the one hand or the other—for entertaining the opinion he has expressed.

THE NEW COMMISSIONER OF PATENTS.—Hon. Philip Frank Thomas, of Maryland, was confirmed on the 15th inst., as Commissioner of Patents, and has entered on the discharge of his duties. We trust that the Commissioner will find his new duties agreeable, and that he will show, at the outset, a generous and steady interest in the Inventor and the Patentee.

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